The Effectiveness of Price Limit Imposed on Stock Market in Mainland China

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Abstract

According to stock exchange regulations in Mainland China, in order to mitigate excessive volatility and protect ordinary investors from market manipulation, the price of any stock cannot change by more than 10 percent from its previous day's closing price on any given trading day. Although the price limit regulation exists in a substantial number of financial markets around the world and has attracted much attention from government regulators, industrial practitioners, and academic researchers, the existing literature is limited. In consideration of inconclusive arguments and out-of-date samples in previous research about emerging markets, it is necessary to reconsider the effectiveness of price limit with more recent data through an insightful approach. The purpose of this study is to show that price limit in the Chinese stock markets is ineffective to some extent, in that they cannot successfully mitigate market volatility or provide higher returns to investors. In order to better understand the effects of price limit, this study utilizes historical stock price data in the Chinese stock markets over 20 years, which includes both periods with and without the price limit regulation. The fundamental idea of this study is to analyze volatilities and returns of different periods, based on overall market, various industries, various market caps, and selective sample stocks. The empirical results in the research show that price limit regulation works under certain circumstances while fails to mitigate volatilities or provide higher returns in most cases. The findings exactly match the hypothesis and indicate ineffectiveness of price limit regulation. In conclusion, this study could be used as empirical evidence for implementing appropriate stock market regulations, and promoting stock market microstructural reforms, especially for emerging markets.

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Table of Contents

1. Introduction……1

1.1 Motivation……1

1.2 Literature Review……2

1.3 Overview of Chinese Stock Market.……..6

1.4 Price Limit Regulation……..6

1.5 Brief Summary of Findings……8

2. Data Preparation……9

2.1 Research Data……9

2.2 Subperiod Designation……9

2.3 Day 0 Definition……10

2.4 Price Limit Hit Days……..11

3. Methodology……12

3.1 Volatility Measurement……12

3.2 Back to "Normal" Volatility Approach……12

3.3 Difference-in-Differences Approach……..13

4. Empirical Results……15

4.0 Remarks……15

4.1 Overall Market……15

4.2 Various Industries……..21

4.3 Various Market Caps……23

4.4 Sample Stocks……24

5. Concluding Remarks……25

5.1 Conclusions……25

5.2 Implications……26

5.3 Future Research……26

References……28

Appendix……29

A. Overall Market……29

B. Agriculture, Forestry, and Fishing Industry……31

C. Mining Industry……34

D. Construction Industry……37

E. Manufacturing Industry……40

F. Transportation, Communications, Electric Industry……43

G. Wholesale Trade Industry……46

H. Retail Trade Industry……49

I. Finance, Insurance, and Real Estate……52

J. Services……55

K. Large Cap Stocks……58

L. Mid Cap Stocks……62

M. Small Cap Stocks……66

N. Sample Stocks……70

1. Introduction

1.1 Motivation

According to stock exchange regulations in Mainland China, in order to mitigate excessive volatility and protect ordinary investors from market manipulation, the price of any stock cannot change by more than 10 percent from its previous day's closing price on any given trading day. Price limit is an artificial boundary that is imposed by exchange regulators to restrict extreme daily security price movements (Chen, Rui and Wang 2005). Although the price limit regulation exists in a substantial number of financial markets around the world and has attracted much attention from government regulators, industrial practitioners, and academic researchers, the existing literature is limited (Chen, Rui and Wang 2005). Daily price limit supposedly contributes to the control of volatility by establishing price constraints and providing time for rational reassessment during times of noise trading. However, critics of price limit claim that price limit causes higher volatility levels on subsequent days (volatility spillover hypothesis), prevents prices from efficiently reaching their equilibrium level (delayed price discovery hypothesis), and interferes with trading due to limitations imposed by price limit (trading interference hypothesis) (Kim and Rhee 1997).

Are price limit effective in achieving their intended goals? Due to the inability to perfectly compare price behaviors with and without price limit, prior studies have not been able to answer this question in a convincing fashion (Kim, Liu and Yang 2011). One of the major obstacles of analyzing the price limit regulation is extremely difficult to find a control group. In other words, it is impossible to ascertain whether those markets with

price limit would be better or worse off without price limit. Fortunately, Chinese stock market, as the only stock market in the world that has experienced both periods trading with and without price limit, provides an ideal natural experiment setting to assess the effectiveness of price limit regulation more precisely. Therefore, in consideration of inconclusive arguments and out of date samples in previous research, it is necessary to reconsider the effectiveness of price limit with more recent data through an insightful approach.

1.2 Literature Review

The benefits and costs of price limit are still controversial. Proponents suggest that price limit would protect the market from overreacting, while opponents argue that they can only slow down price changes (Chen, Rui and Wang 2005). For instance, Ma, Rao, and Sears (1989) find price limit tends to stabilize price movements and decrease the price volatility of U.S. futures market. Lee and Kim (1995) provide evidence regarding the effects of price limit on the reduction of stock price volatility in Korea. Kim, Liu and Yang (2011) argue that price limit in Chinese stock markets moderate market volatility and mitigate abnormal trading activities through comparing two sub-periods with and without price limit. On the other hand, Kim (2001) finds stock market volatility is usually not lower when price limit are more restrictive. Kim and Rhee (1997) show some convincing evidence that price limit cause volatility to spillover to the subsequent days.

In a research article by Kim and Rhee (1997), the main purpose was to examine the effectiveness of the price limit system in the Tokyo Stock Exchange through testing three critical problems with price limit including the volatility spillover hypothesis (Fama 1989), the delayed price discovery hypothesis (Fama 1989), and the trading interference hypothesis (Lauterbach and Ben-Zion 1993). The sample consisted of adjusted daily stock price data for the period of 1989 to 1992 from the PACAP Research Center database. Stocks were categorized into “hit”, “90% hit” and “80% hit” according to their price movements on the event day. At first, a 21-day event window was constructed to test the volatility spillover hypothesis. The results showed group “hit” experienced greater volatility during post-event days than other subgroups, which indicated the ineffectiveness of price limit in reducing volatility. Next, to examine effects of price limit on the price discovery process, they looked at two return series for each of the three stock categories including open-to-close returns on the limit day and close-to-open overnight return. The results showed that price continuations occurred more frequently than for stocks that did not reach limits, which was consistent with delayed price discovery hypothesis. Additionally, market adjusted turnover ratios were utilized as a measure of trading activity to test the trading interference hypothesis. The trading interference hypothesis was bolstered by the evidence that trading activity increased on the day after the event day. Although the evidence against price limit seem to be significant based on their analysis, the sample size in this study is insufficient.

Chen, Rui and Wang (2005) conducted a very similar research on this topic, but the objective was to examine the effectiveness of the price limit system in the emerging

Chinese stock market. The sample consisted of daily individual A share stock prices and volume data for the period of December 1996 to December 2003 from the CSMAR database. In fact, they applied exactly the same methodologies as Kim and Rhee (1997) except for a larger sample size from Chinese stock markets. Their results also indicated the ineffectiveness of price limit in reducing volatility by showing group "hit" experienced greater volatility during post-event days than other subgroups. However, the trading inference hypothesis was challenged by the results from Chinese stock markets as trading activities actually decreased significantly instead of increasing after the event day. Except for that, they also found that the effects of price limit were different for bullish and bearish sample periods.

The event day model used in the previous papers has been subject to criticism. Opponents claim that extreme volatility would be underestimated because price movements are truncated at the price limit. Another popular approach to assess price limit effects is to identify markets that have changed their price limit range and compare stock market volatility under different price limit regimes, which is considered as a better method to provide us with more accurate results. Kim (2001) examined the relationship between price limit and stock market volatility based on stock performance of the Taiwan Stock Exchange between 1975 and 1996. The data was divided into six periods according to different price limit range during sample period. After calculating and comparing stock return variance of each group, they concluded that stock market volatility was usually not lower when price limit were made narrower, which was not

consistent with the popular view among regulators that price limit could moderate volatility.

The most recent research about price limit effectiveness also applied the same methodology that focused on a single market with and without price limit. Kim, Liu and Yang (2011) showed some benefits of price limit through their study about China's experience with price limit. China is the only market that has experienced trading with and without price limit. The sample contained daily stock price data of all individual shares in the Shanghai Stock Exchange and the Shenzhen Stock Exchange between September 1992 and December 2000. In order to eliminate confounding effects due to imposing price limit, they defined no-PL-regime from September 1992 to August 1996 and PL-regime from January 1997 to December 2000. This study applied a less popular method to measure daily volatility based on high and low prices in any given trading day instead of daily returns-squared. Their study successfully found convincing evidence showing that price limit could moderate transitory volatility and mitigate abnormal trading activity. However, we cannot easily ignore the fact that both stock markets in Taiwan and China were extremely premature during the first part of sample period. With the development of stock exchanges, diminishing volatility could possibly affect outcomes of both studies.

1.3 Overview of Chinese Stock Market

There are two stock exchanges in China, the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE). Both of them were established in December 1990. According to the trading rules, operating hours for both exchanges are 9:30am to 11:30am in the morning, and 1:00pm to 3:00pm in the afternoon on weekdays except for national holidays. As shown in Exhibit 1.1, currently 959 stocks are listed on the SHSE and 1,537 stocks are listed on the SZSE. The total market capitalization of both exchanges is 3,637.28 billion dollars, and SHSE is twice as large as SZSE in terms of market capitalization. Total numbers of valid accounts is 133.63 million that almost equally shared by two exchanges, since investors tend to open trading accounts for both exchanges at the same time. All of those data are collect through the database of SHSE, SZSE and China Securities Depository and Clearing Company.

Exhibit 1.1 Key Statistics of Chinese Stock Market

	SHSE	SZSE	Total
Listed stocks	**959**	**1,537**	**2,496**
Market Cap ($billions)	**2,388.25**	**1,249.03**	**3,637.28**
Valid Accounts (millions)	**67.57**	**66.06**	**133.63**

1.4 Price Limit Regulation

Currently, Chinese stock market operates under the price limit regulation. According to the rules, the price of any stock cannot change by more than 10 percent from its previous day's closing price on any given trading day. In other words, stocks are

intentionally prohibited to move up or down by more than 10% on a daily basis. There is no special announcement needed when a certain stock hits either the upside or downside price limit; however, investors can easily find out the information on the trading screens. In fact, trading of the certain stock is allowed to continue even though it hits the price limit, but only those orders at or within the limit-price are able to get executed (Kim, Liu and Yang 2011).

Over the past 20 years, Chinese stock market has experienced with various price limit regulations. The following tables illustrate the details of price limit rules imposed on SHSE and SZSE over different time periods. Our study focuses on the most important two periods in Chinese stock market. The first period is the 4 years between 1992 and 1996 when both exchanges eliminated the price limit regulation and operated freely. The second period is from the end of 1996 to present that operates under a symmetric 10% price limit for both exchanges.

Exhibit 1.2 Price limit in SHSE (Kim, Liu and Yang 2011)

Time Period	Price limit
07/27/1990-12/18/1990	±3.0%
12/19/1990-12/26/1990	±5.0%
12/27/1990-01/06/1991	±1.0%
01/07/1991-04/25/1991	±0.5%
04/26/1991-05/20/1992	±1.0%
05/21/1992-12/15/1996	No limits
12/16/1996-present	±10.0%

Exhibit 1.3 Price limit in SZSE (Kim, Liu and Yang 2011)

Time Period	Price limit
05/30/1990-06/17/1990	±10.0%
06/18/1990-06/25/1990	±5.0%
06/26/1990-11/20/1990	Up:+1.0% Down:-5.0%
11/21/1990-12/13/1990	±5.0%
12/14/1990-01/01/1991	Up:+5.0% Down:-2.0%
01/02/1991-08/16/1992	±0.5%
08/17/1992-12/15/1996	No limits
12/16/1996-present	±10.0%

1.5 Brief Summary of Findings

Our study provides three major sets of findings. First, we find the price limit regulation has different effects on stocks that hit upper price limit and lower price limit. In simple terms, the price limit regulation is able to provide a slightly higher return for investors who own stocks that hit lower price limit; however, it fails to work as expected for stocks that hit upper price limit. As for the function of mitigating volatility, overall our results are against the regulatory intention, and we find no evidence proving the price limit regulation is able to stabilize the market. Second, we find that stocks from different industries have similar results, which are consistent with the market. Nevertheless, we do see a small degree of deviations among industries. Finally, we find stocks of various market caps also have comparable results as industries. To sum up, our study shows some convincing evidence that the price limit regulation does not work effectively or perfectly to mitigate volatilities and provide favorable returns.

2. Data Preparation

2.1 Research Data

We obtain Chinese stock market data from the Datastream Professional database. The database contains daily stock information from the first trading day of Chinese stock market to July 31, 2013. The data includes individual stock price, unadjusted price, return index, return, and market value on a daily basis. In addition, it also contains translated stock names, Datastream codes, and Standard Industrial Classification (SIC) codes.

2.2 Subperiod Designation

The main purpose of this project is to understand the effectiveness of the price limit regulation. Therefore, we need to define one subperiod without price limit regulation, and another one with the presence of price limit. As we mentioned before, the SHSE did not have daily price limit from May 21, 1992 to December 15, 1996; and the SZSE also operated without price limit from August 17, 1992 to December 15, 1996. In order to obtain a consistent time period for both exchanges, we decide to define the no-PL-period from September 1, 1992 to August 30, 1996. Since the price limit regulation was re-imposed on both exchanges from December 16, 1996, we decide to define the PL-period from January 1, 1997 to July 31, 2013. There are several factors that have been considered to make the decision. At first, we intentionally include a 2-week idle period right after the regulatory changes in order to eliminate possible confounding effects due to transitions. Additionally, the PL-period includes the most

recent data, and we believe it would provide a more convincing result than out-of-date studies.

Exhibit 2.1 Subperiod Designation

no-PL-period	PL-period
09/01/1992-08/30/1996	**01/01/1997-07/31/2013**

2.3 Day 0 Definition

Day 0 is the so-called "event day" in our study, which is also the day when the price limit regulation takes effect. Since we are interested in the effects of price limit on both up and down directions, we now introduce the ideas of "upper hits" and "lower hits". Price limit is 10% symmetrically for both directions during the PL-period. In order to solve issues related to the discrete tick size and rounding errors, we consider a certain day as the "upper hits" day if return is higher than 9.5% , and a certain day as the "lower hits" day if return is lower than -9.5%. This rule applies to both of the no-PL-period and the PL-period. The only difference is that it is an imaginary boundary for the subperiod without price limit. PL-period has a larger number of Day 0s because of a longer sample period. One interesting fact is that during both periods, number of upper hits day 0s are almost as twice large as number of lower hits day 0s, which could be explained by the upside trending of Chinese stock market.

Exhibit 2.2 Number of Day 0s

	Upper Hits Day	Lower Hits Day	Total
no-PL-period	747	388	1,135
PL-period	46,634	27,508	74,142

2.4 Price Limit Hit Days

In order to better understand daily volatilities and returns surrounding days when stocks hit price limit. We define Day 0 is the day when a certain stock hits the price limit. Day -1 is the day before, while Day 1 is the day after, and so forth. We will focus on a range from Day -1 to Day 10. Under some circumstances, we do see that stocks hit price limit multiple times within 10 days. Although Miller (1989) points out that there is no consensus about whether keeping multiple hits or removing them from the sample, we believe multiple hits should be retained as they also have significant implications. The following chart illustrates how we define price limit hit days with multiple hits.

Exhibit 2.3 Price Limit Hit Days with Multiple Hits

Name	Date	Price Limit Hit?	Day
Inner Mongolia Lantai "A"	5/5/2006		-1
Inner Mongolia Lantai "A"	5/8/2006	Yes	0
Inner Mongolia Lantai "A"	5/9/2006		1
Inner Mongolia Lantai "A"	5/10/2006		2
Inner Mongolia Lantai "A"	5/11/2006		3
Inner Mongolia Lantai "A"	5/12/2006		-1
Inner Mongolia Lantai "A"	5/15/2006	Yes	0
Inner Mongolia Lantai "A"	5/16/2006		1
Inner Mongolia Lantai "A"	5/17/2006		2
Inner Mongolia Lantai "A"	5/18/2006		3
Inner Mongolia Lantai "A"	5/19/2006		4
Inner Mongolia Lantai "A"	5/22/2006		5
Inner Mongolia Lantai "A"	…		…

3. Methodology

3.1 Volatility Measurement

A substantial portion of our study is to analyze whether the price limit regulation could successfully mitigate market volatility. Consequently, it is very important to choose an appropriate volatility measurement. Volatility measurement based on daily high and low prices is commonly utilized. However, since we do not have those data available, this approach is no longer feasible for our project. Cotter (2011) mentions that absolute returns have many advantages in modelling volatility. First, absolute returns are robust in the presence of extreme or tail movements (Davidian and Carroll, 1987). Second, absolute return volatility measurement uses data with the highest frequency and this is beneficial in getting more precise estimates of risk measures (Merton, 1980). Therefore, we decide to use absolute returns as volatility measurement in our study.

$$v = |r|$$

3.2 Back to "Normal" Volatility Approach

Kim, Liu and Yang (2011) introduce a back to "normal" volatility approach in their project. Intuitively, there would always be a standard volatility level in the market during a specific time period. When extreme price movement occurs, such as hitting price limit, volatility would increase significantly with no doubt. Their idea is to test whether volatility goes back to "normal" level faster when stocks hit real price limit compared with hitting imaginary boundary. In their study, they consider volatility on Day -1 as the "normal" level; however, we do not believe it is an accurate measurement

of the true standard volatility because there might be some unobserved factors resulting in an early movement of stock price before Day 0. Therefore, we decide to use the average daily volatility as the "normal" level of volatility for both subperiods. Then, we can obtain the volatility level from Day 0 to Day 10, and compare them to test which subperiod goes back to "normal" faster. If it takes less days for the PL-period to revert to the standard level, then we might conclude that the price limit regulation works. We will discuss detailed results in the next big section.

3.3 Difference-in-Differences Approach

Although the back to "normal" approach could be a possible method to find out whether price limit can successfully stabilize the market, we still need to develop a method to test in depth whether investors benefit from the price limit regulation and realize higher returns. In fact, directly comparing average daily returns and volatilities between two subperiods is impossible to be considered as convincing evidence. The main reason is that there are countless unobserved factors that cannot be ignored. With the development of Chinese stock market over 20 year, size of the market, number of listed stocks, and number of institutional investors have increased significantly. All of those factors might also contribute to stock market that is more stable and provides higher returns. As a result, even if we are able to show lower volatilities and higher returns during the PL-period, we still could not reach the conclusion that price limit is effective.

Freedman (1991) suggests that a good research design is so essential that cannot be substitute by statistical technique. The main research design problem in

our study is to figure out the treatment and control groups for the price limit regulation. As we mentioned above, suppose we assume no-PL-period as the control group, the PL-period is not the treatment group for the price limit because of unobserved factors. However, the Difference-in-Differences approach provides a better solution to capture the real effects of price limit. The following steps elaborate how we apply this approach to reach our goals. First of all, we could use daily average volatility as the "normal" level. Let's assume A and B are the standard volatility levels during no-PL-period and PL-period, respectively. Then we can also assume C and D are the volatility levels of price limit hits days during no-PL-period and PL-period, respectively. It follows that the difference between A and B should be viewed as the "normal" difference level between two subperiods, while the difference between C and D reflects the "normal" difference plus the effects of price limit. Therefore,

$$(C - D) - (A - B)$$

is a sound estimator of the effect of price limit regulation. If the estimator is greater than 0, then we could conclude that price limit is effective in mitigating volatilities.

This Difference-in-Differences approach could also be applied for evaluating the effects on returns. Unlike volatilities, investors prefer higher returns. Consequently, we need the estimator to be less than 0 to argue that price limit effectively provides higher returns. The following table illustrates possible conclusions based on this approach.

Exhibit 3.1 Difference-in-Differences Estimator Interpretation

D-in-D Estimator	Lower Volatility	Higher Returns
Greater than 0	Yes	No
Equal to 0	No	No
Smaller than 0	No	Yes

4. Empirical Results

4.0 Remarks

We use a 95% confidence interval for every statistical test in our study. All results presented in this section are statistically significant at 95% confidence interval. We directly consider any results to be zero if they are not statistically different than zero at the 95% confidence interval. For all of our analysis, we focus on means rather than medians, while both measurements provide similar results.

4.1 Overall Market

4.1.1 Back to "Normal"

According to our results, the standard level of daily volatilities is 0.0216 during no-PL-period and 0.0184 during PL-period. This is not surprising at all because we anticipate a lower volatility with the development of Chinese stock market. As shown in the exhibits below, during both subperiods, there are consistent patterns of volatilities for upper hits and lower hits across Day -1 to Day 10. First, the volatility level is significant higher than "normal" on Day -1, which suggests that the method Kim, Liu and Yang (2011) use is problematic. The standardized volatility level on Day -1 is not a good

measurement for the “normal” level. Second, the volatility level has a huge jump on the Day 0, when stocks hit price limit. It is reasonable since stocks have to move more than 9.5% to be considered as hitting price limit. Third, we notice a clear decreasing trend in the volatility level from Day 1 during the PL-period; however, the trend during no-PL-period could not be determined easily.

Exhibit 4.1 Overall no-PL-period Volatility

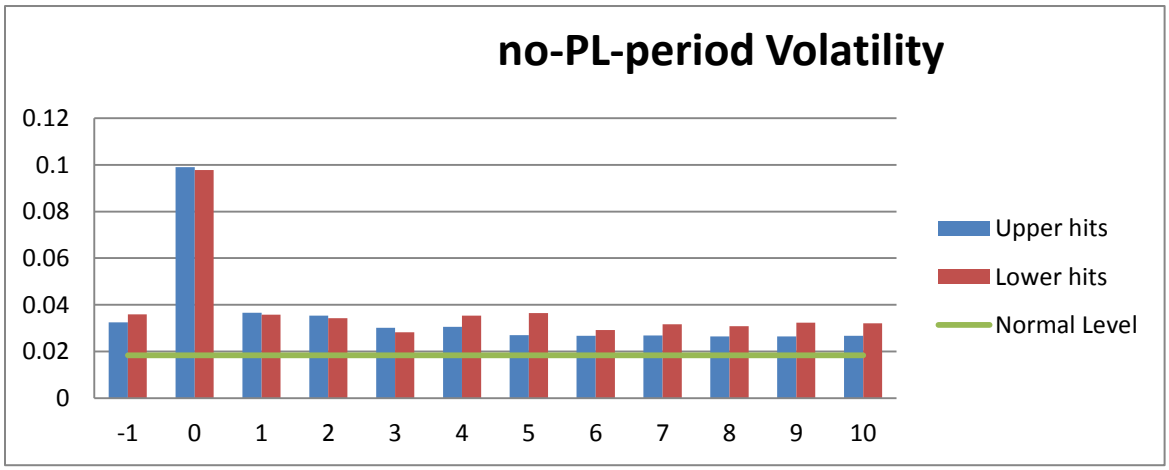
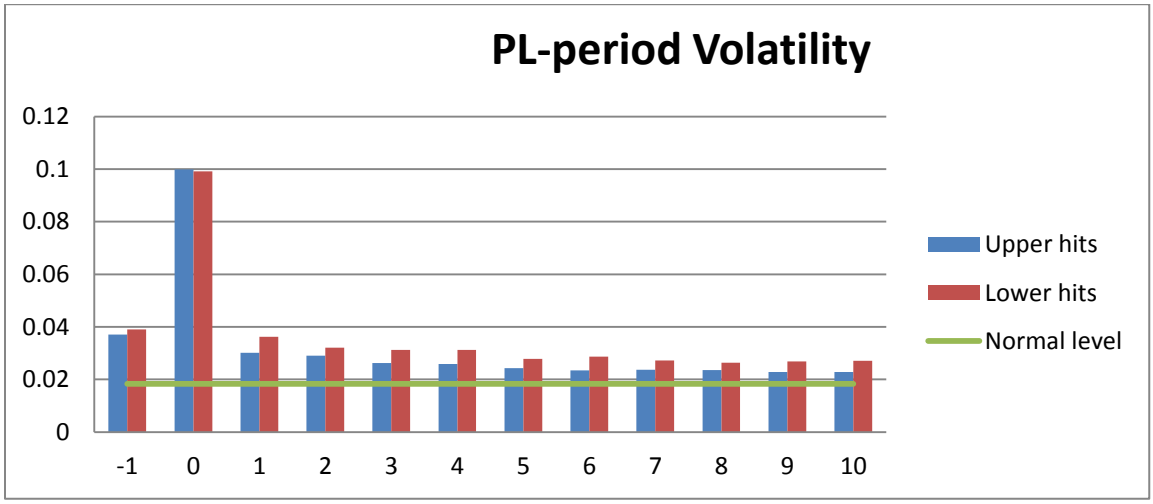


Exhibit 4.2 Overall PL-period Volatility

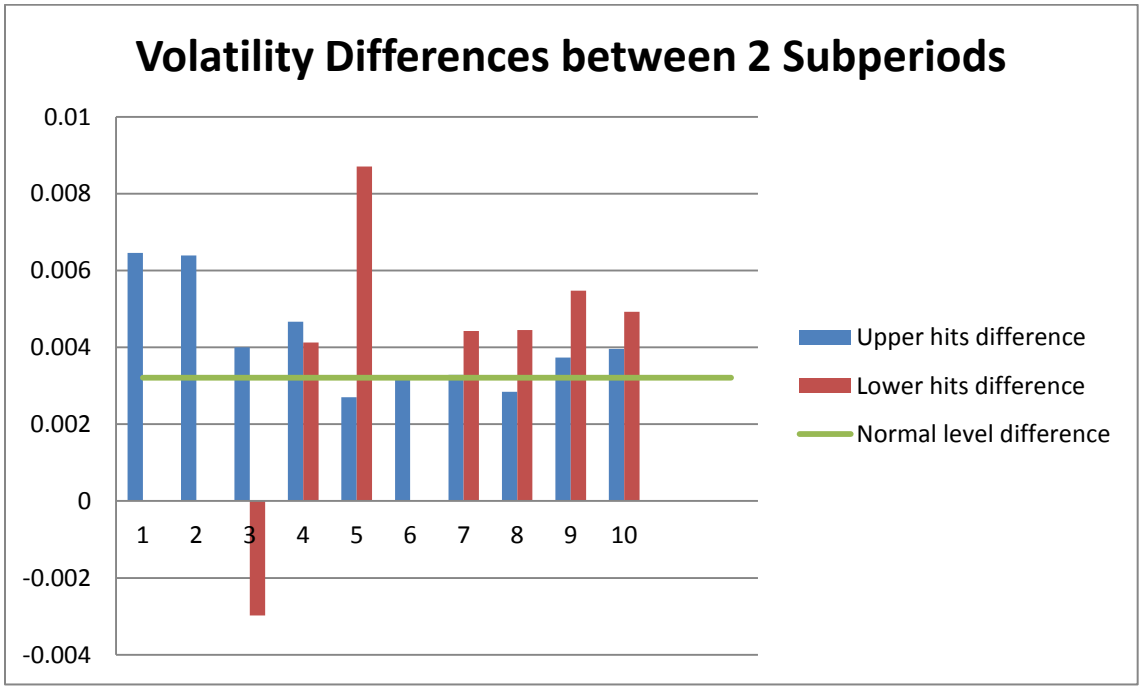


As for the back to “normal” approach, unfortunately, we end up with inconclusive results. During no-PL-period, the volatility level for both upper hits and lower hits does not revert back to the “normal” level within 10 days after Day 0. This situation also occurs during PL-period so that we could not be able to decide whether it takes a longer or shorter time for stocks returning to the “normal” level during PL-period. In fact, the conclusion challenges the results from Kim, Liu and Yang (2011), mainly because they have an inappropriate estimator for the “normal” level. Nevertheless, we do realize that on Day 9 and Day 10, the volatility level during PL-period is closer to the “normal” level, which only implies that price limit might mitigate volatilities.

4.1.2 Difference-in-Differences

The following chart illustrates volatility differences between 2 subperiods from Day 1 to Day 10. We find different results for upper hits and lower hits. For upper price limit hits, volatility differences across the 10 days are all positive, which means that we do find a lower volatility during the PL-period. However, the situation changes for lower hits. On one hand, volatilities differences on Day 1 and Day 2 are indifferent from 0 statistically. On the other hand, the counterintuitive result on Day 3 even suggests a higher volatility during the PL-period.

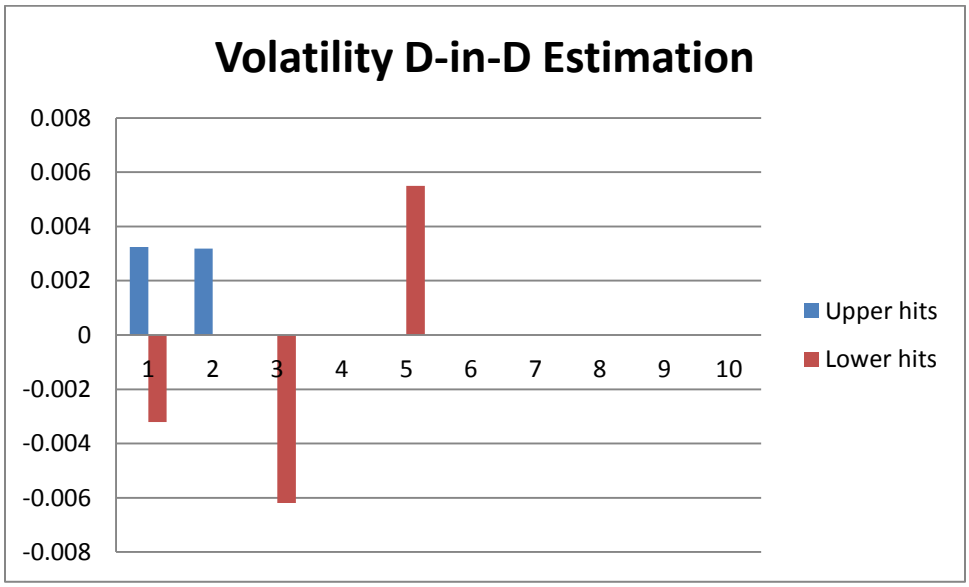
Exhibit 4.3 Overall Volatility Differences



As we explained in the methodology section, volatility differences between 2 subperiods could not be viewed as a good indicator to capture the effects of price limit. Therefore, we are interested in the Difference-in-Differences estimator of volatilities. In fact, we also end up with different outcomes for upper hits and lower hits, which suggest that price limit regulation has various effects that based on the directions of stock price movements. For upper hits, we see two positive estimators on Day 1 and Day 2. According to Exhibit 3.1, price limit mitigates volatility level for the immediate following two days while having no effect after that. For lower hits, the estimation suggests that price limit actually increases volatility level on Day 1 and Day 3, but has no effect on most of the days. In addition, we also notice that price limit mitigates volatility levels on Day 5. Inconsistent outcomes for lower hits make it difficult to interpret effects of price limit on this direction. To sum up, in terms of mitigating volatilities, we believe

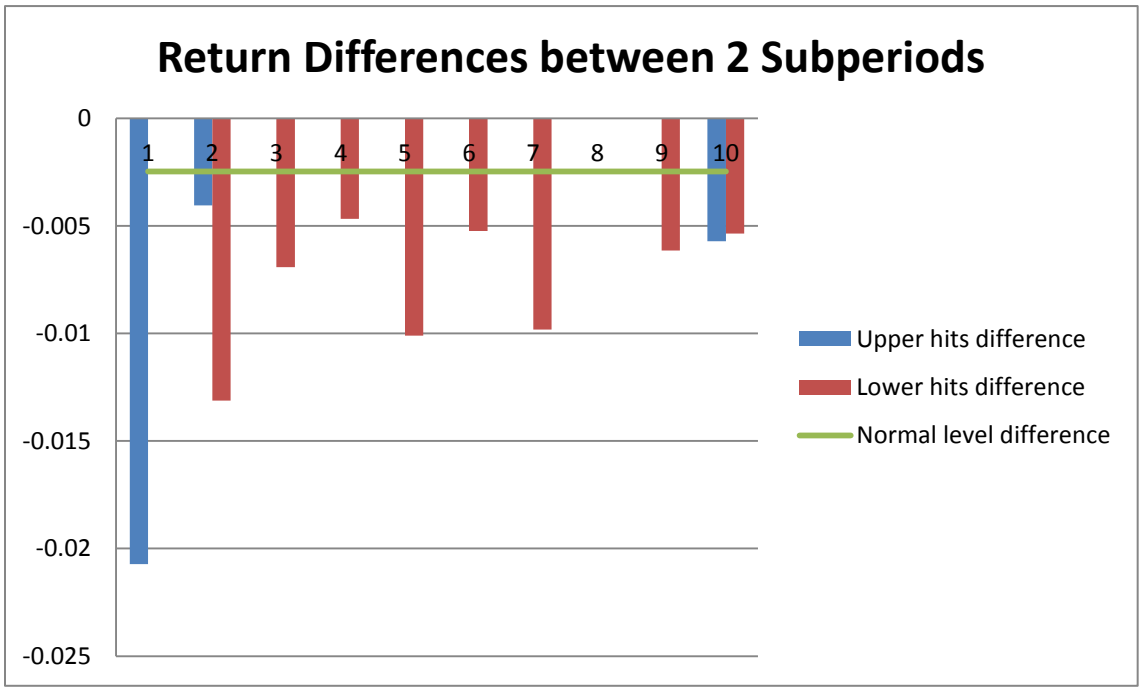
that the price limit works differently based on the situations. We do see some evidence that it successfully stabilizes the market after upper hits; however, it does not work as expected after lower hits.

Exhibit 4.4 Overall Volatility D-in-D Estimation



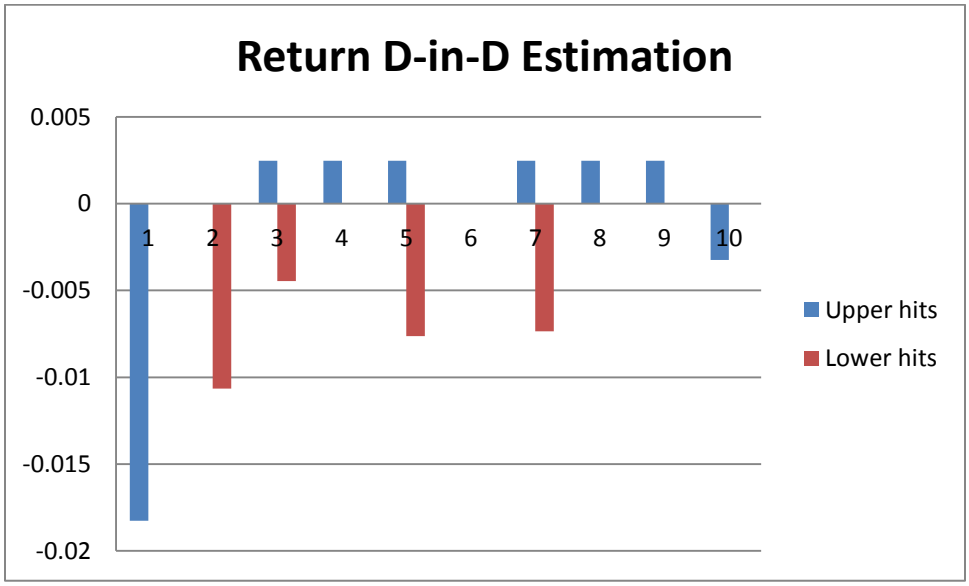
The same procedure could be utilized to find out whether investors benefit from the price limit regulation and obtain higher returns. Same as volatilities, we also find various results for upper hits and lower hits. For example, Day 1 return is higher only for upper hits during the PL-period, which suggests that the delayed price discovery hypothesis does not apply to lower hits. For upper hits, we do not observe any differences between 2 subperiods for most of the days following the price limit hits. However, we notice that returns are higher for most of the days during PL-period for lower hits.

Exhibit 4.5 Overall Return Differences



We are unable to reach at any conclusions about returns without looking at the Difference-in-Differences estimation. Once again, we come up with different results for upper hits and lower hits. On one hand, most of the estimators of upper hits are positive, which indicates that price limit decreases the returns on Day 3, 4, 5, 7, 8, and 9. On the other hand, for lower hits, the price limit regulation provides higher returns on Day 2, 3, 5, and 7. To sum up, in terms of providing higher returns, we believe that the price limit also works differently based on the situations. Ordinary investors could benefit from price limit for lower hits but not the upper hits. However, it is sound to conclude that price limit regulation cannot guarantee higher returns for investors as expected.

Exhibit 4.6 Overall Return D-in-D Estimation



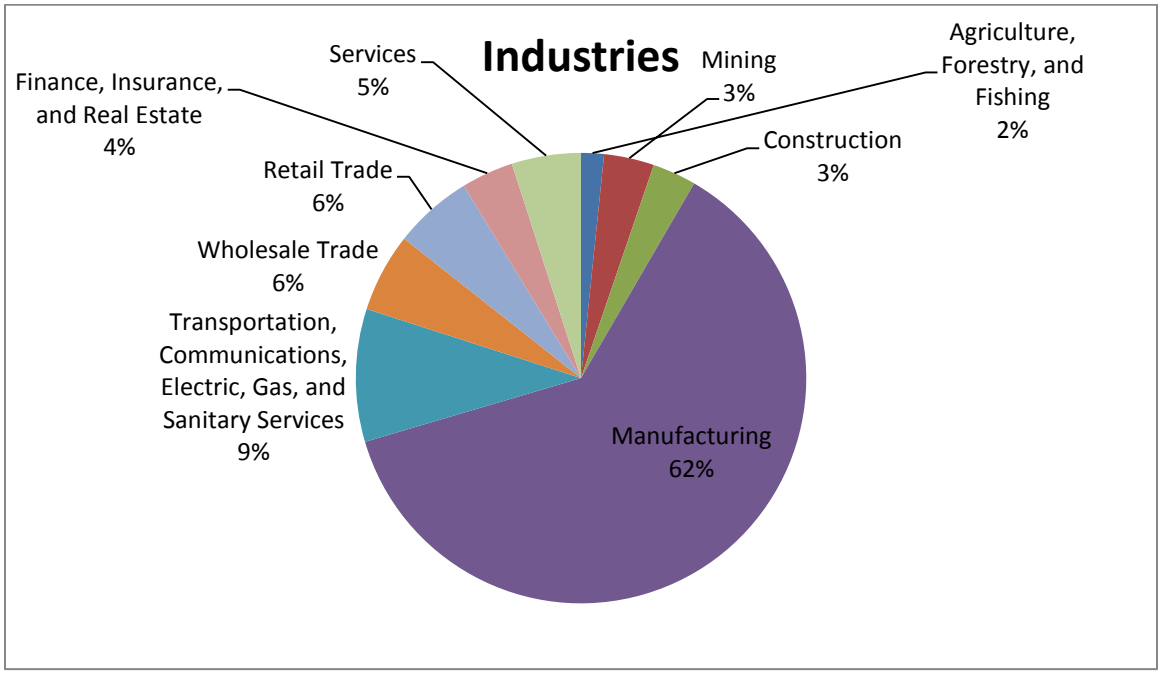
4.2 Various Industries

Once we come up with conclusions from the standpoint of overall market, then our focus moves to understand whether price limit has different effects among industries. We categorize industry groups according to the SIC codes. There are 9 industries in our sample as shown in Exhibit 4.7. More than 60% of the stocks listed on the SHSE and SZSE are in the manufacturing industry.

Exhibit 4.7 Industry List

Industry List
Agriculture, Forestry, and Fishing
Mining
Construction
Manufacturing
Transportation, Communications, Electric, Gas, and Sanitary Services
Wholesale Trade
Retail Trade
Finance, Insurance, and Real Estate
Services

Exhibit 4.8 Percentage of Stocks by Industry



Although we observe slightly discrepant results among various industries, effects of price limit are consistent with our analysis for the overall market on average. However, we do find some interesting facts related to the price limit regulation on an industry basis. At first, our results show that the price limit stabilizes the market when stocks in the manufacturing and mining industries hit the upper price limit; but the price limit increases volatility when stocks in the transportation, whole trade and finance hit the lower price limit. Under other circumstances, we find no evidence showing that the price limit has any impacts. Additionally, we observe higher returns when stocks hit the lower price limit across most industries, which means that investors might benefit from the regulation if stocks crash; but in some industries, we find lower returns after upper price limit hits. Unfortunately, the implication of returns is not as clear as volatilities. All data and graphs related to the results of industry test are included in the appendix.

4.3 Various Market Caps

Once we come up with conclusions from the standpoint of various industries, then our focus moves to understand whether price limit has different effects among stocks that have various market caps. As shown in Exhibit 4.9, we classify stocks whose market caps are below the 20th percentile as small cap, between the 20th and 50th percentiles as mid cap, and above the 50th as large cap.

Exhibit 4.9 Market Cap

Market Cap	Percentage	Market Value (in millions $)
Small	20%	Less than 159.14
Mid	30%	Between 159.14 and 341.58
Large	50%	More than 341.58

Same as industry test above, we observe slightly different results in various market cap categories. Mid cap and large cap stocks are consistent with our analysis for overall market on average; however, small cap stocks have opposite results when it comes to volatility.

For large cap stocks, first, volatilities during both subperiods do not return back to "normal" level within 10 days after hitting price limit. Second, our results only show that price limit provides a lower volatility on Day 3 when stocks hit upper limit. Third, we fail to find strong evidence supporting that investors who hold large cap stocks could benefit from the price limit regulation. Therefore, we conclude that the price limit is ineffective for large cap stocks.

For mid cap stocks, first, volatilities during both subperiods also do not return back to "normal" level within 10 days after hitting price limit. Second, our results show that the price limit actually increases volatilities when stock hit lower limit. Third, we could safely arrive at a conclusion from the difference-in-difference return estimators that price limit could not guarantee higher returns for mid cap stocks. Therefore, we believe that the price limit is also ineffective for mid cap stocks.

For small cap stocks, first, volatilities during both subperiods also do not return back to "normal" level within 10 days after hitting price limit. Second, as mentioned above, our results end up with opposite conclusions about volatilities. The volatility level is higher when small cap stocks hit the lower limit, and the level is lower after hitting the upper limit. Therefore, we conclude that price limit is somewhat effective for small cap stocks only after experiencing lower hits.

In conclusion, the price limit regulation is ineffective for mid cap and large cap stocks, while it might be effective for small cap stock under specific conditions. All data and graphs related to the results of market cap test are included in the appendix.

4.4 Sample Stocks

Once we come up with conclusions from the standpoint of various market caps, we also apply our methodology to test a predetermined group of sample stocks. We are able to better control unobservable factors and assess the effectiveness of price limit by selecting a group of sample stocks. On September 1, 1992, the first day of the no-PL-period, there are 29 stocks in total listed on either SHSE or SZSE. The 29

stocks are actively traded throughout the two subperiods. As a result, we decide to use them as sample stocks for our analysis. A complete list of the 29 stocks is available in the appendix.

For sample stocks, we observe negative volatility estimators on Day 3 and Day 7 after lower hits, which suggest that the price limit only stabilizes the sample stocks on some days following lower hits. Same as all tests illustrated above, the price limit regulation is effective in some specific situations, but a substantial amount of our results support the ineffectiveness of price limit. All data and graphs related to the results of sample stocks test are included in the appendix.

5. Concluding Remarks

5.1 Conclusion

Our study provides three major sets of findings. First of all, most of our results prove that the price limit regulation is ineffective in mitigating volatilities or providing higher returns, and we also find evidence showing that price limit works under certain circumstances. In addition, although price limit is symmetric on both directions, the effects caused by the rule are different for upper hits and lower hits. Aside from that, we also observe different effects caused by the price limit regulation among various industries and market caps. To sum up, our study shows some convincing evidence that the price limit regulation does not work effectively or perfectly to mitigate volatilities and provide favorable returns as expected.

5.2 Implication

Our study provides an original and innovative view to reconsider the effectiveness of price limit imposed in Mainland China. At first, the results are meaningful not only for regulations in Chinese stock market, but also other stock exchanges with price limit rules. In addition, outcomes from our project also give birth to a lot of new questions about price limit. For example, would asymmetric price limit regulation works better? Should we impose different rules for various industries? Should we only restrict the price movement of small cap stocks? Furthermore, the methodology introduced in this study could be extended to analyze other questionable regulations in the stock market. As a result, our study should be considered as empirical evidence for implementing appropriate price limit regulation, and promoting stock market microstructural reforms.

5.3 Future Research

This research project could be improved in a couple of ways. At first, the way we define Day 0 is not flawless. Since we do not have the daily high and low price, we are unable to capture those stocks that hit price limit in the middle of trading days. One possible solution is to obtain new data that contains more information. Second, we could also use other volatility measurement such as return-squared to replicate our study to check whether we are able to end with consistent results. Finally, our research only focuses on the daily average returns and volatilities on the basis of individual

stocks. We could also account for the weights of individual stocks based on market value, which leads us to market-wide daily average returns and volatilities.

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Appendix

A. Overall Market

A.1 Volatility Results

Volatility							
	Upper hits (Mean)					Upper hits (Median)	
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0370714	0.0325325	-0.0045389	-0.0077488	-1	0.0276092	0.0259917
0	0.099854	0.0990433	-0.0008106	-0.0040205	0	0.1	0.0988539
1	0.0301914	0.0366462	0.0064548	0.0032449	1	0.0250768	0.0334353
2	0.0289891	0.0353784	0.0063893	0.0031794	2	0.0223464	0.0305499
3	0.0262241	0.0302209	0.0039968	0	3	0.0193592	0.0255088
4	0.0259087	0.030579	0.0046702	0	4	0.01983	0.0260969
5	0.0243152	0.0270167	0.0027015	0	5	0.0177515	0.021102
6	0.0234344	0.0267101	0.0032757	0	6	0.0166496	0.0227376
7	0.0236492	0.026934	0.0032848	0	7	0.0174944	0.0215385
8	0.0236218	0.026461	0.0028392	0	8	0.0171265	0.0206677
9	0.0227806	0.0265163	0.0037357	0	9	0.016129	0.0200617
10	0.0227907	0.0267522	0.0039615	0	10	0.0167384	0.0210356
	504081	8588				504081	8588
	Lower hits (Mean)					Lower hits (Median)	
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0390081	0.0359838	0	-0.0032099	-1	0.0304054	0.0304107
0	0.0991296	0.097754	-0.0013756	-0.0045855	0	0.0995711	0.0977946
1	0.0361928	0.0358498	0	-0.0032099	1	0.0306657	0.029963
2	0.0320796	0.0342784	0	0	2	0.0254244	0.0318275
3	0.0312432	0.0282663	-0.0029769	-0.0061868	3	0.0255165	0.0224467
4	0.0312309	0.0353555	0.0041247	0	4	0.0245203	0.0306122
5	0.0277942	0.0364963	0.0087022	0.0054923	5	0.019694	0.0322017
6	0.0287259	0.0292337	0	0	6	0.021228	0.0229397
7	0.027233	0.0316563	0.0044233	0	7	0.0207715	0.0270983
8	0.0264271	0.0308754	0.0044483	0	8	0.0206186	0.0248447
9	0.026893	0.0323695	0.0054765	0	9	0.0198001	0.028103
10	0.0271518	0.0320802	0.0049284	0	10	0.0210118	0.0260415
	292933	4406				292933	4406

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0135299	*	0.0016226		-0.0119073	-0.009437
0	0.099854	*	0.0990433	*	-0.0008106	0.0016597
1	0.0065595	*	-0.0141633	*	-0.0207228	-0.0182525
2	-0.0076753	*	-0.0117249	*	-0.0040496	0
3	-0.0025932	*	-0.000537		0	0.0024703
4	-0.0019062	*	-0.0014756		0	0.0024703
5	-0.0051477	*	-0.0039381	*	0	0.0024703
6	-0.0019368	*	-0.0035438	*	0	0
7	-0.0011997	*	-0.0011303		0	0.0024703
8	-0.0018773	*	0.0001945		0	0.0024703
9	-0.0020652	*	-0.0003844		0	0.0024703
10	0.0004773	*	-0.0052424	*	-0.0057197	-0.0032494
	504081		8588			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0067682	*	0.0023241	
0	0.1	*	0.0988539	*
1	0.0050786	*	-0.0178037	*
2	-0.0030248	*	-0.0137441	*
3	0		0	
4	0		-0.0011054	
5	0		-0.0025707	*
6	0		-0.0026316	*
7	0		0	
8	0		0	
9	0		0	
10	0		-0.0049922	*
	504081		8588	

Lower hits (Mean)

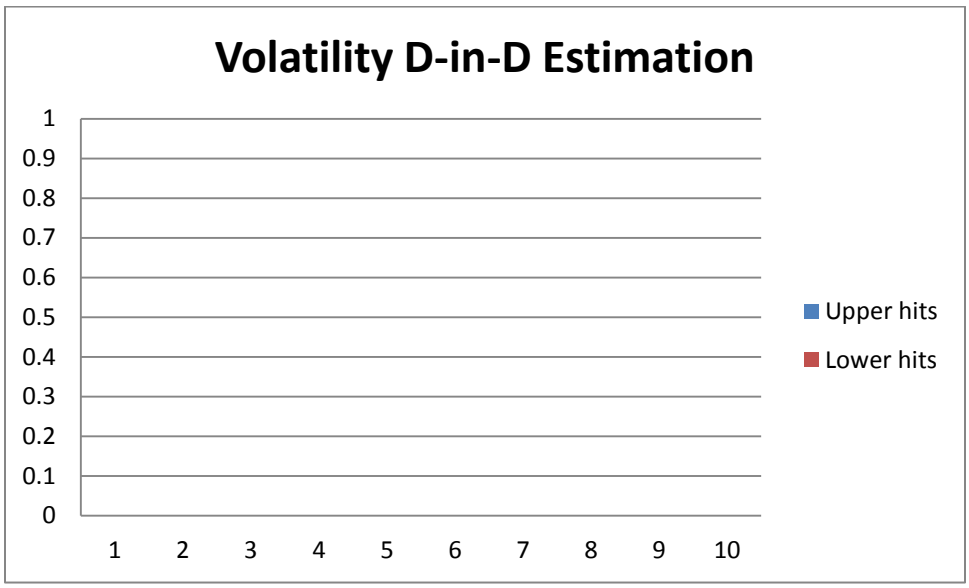
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.01509	*	0.0009279		0.0160179	0.0184882
0	-0.0991296	*	-0.097754	*	0.0013756	0.0038459
1	0.002087	*	0.0031929		0	0
2	0.0067404	*	-0.0063846	*	-0.013125	-0.0106547
3	0.0073504	*	0.0004273		-0.0069231	-0.0044528
4	0.0038243	*	-0.0008537		-0.0046781	0
5	0.0057777	*	-0.0043233		-0.010101	-0.0076307
6	0.0027233	*	-0.0025206		-0.0052439	0
7	0.0069282	*	-0.0028878		-0.009816	-0.0073457
8	0.0007869	*	-0.0002096		0	0
9	0.0074619	*	0.0013118		-0.00615	0
10	0.0045244	*	-0.0008413		-0.0053657	0
	292933		4406			

Lower hits (Median)

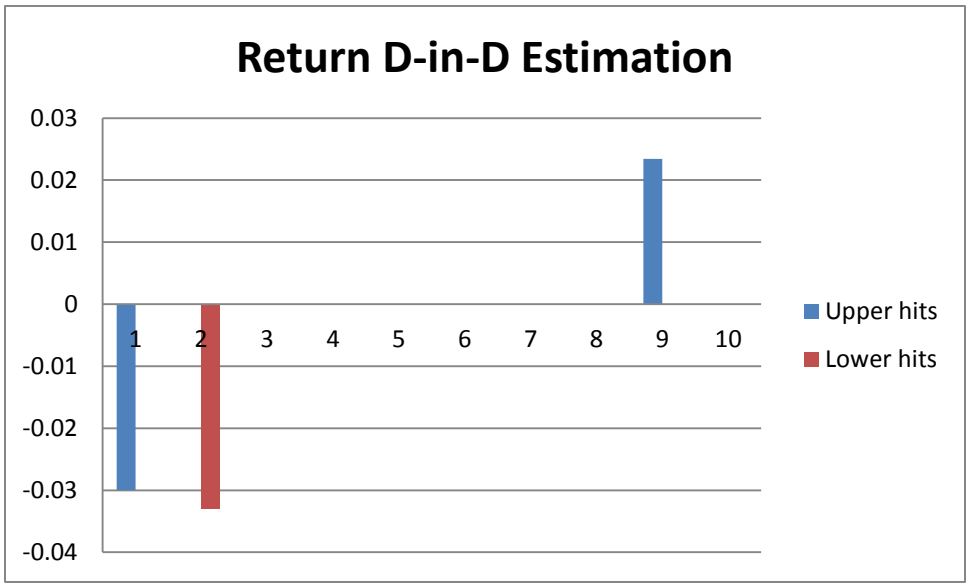
Day	Limit	Significance	No limit	Significance
-1	-0.0078989	*	-0.000811	
0	-0.0995711	*	-0.0977946	*
1	0.0034536	*	0.0015106	
2	0.0044053	*	-0.0033286	
3	0.0048854	*	0	
4	0.0011364	*	0.0003537	
5	0.0030884	*	0	
6	0.0014216	*	-0.0010309	
7	0.0036043	*	0	
8	0		0	
9	0.0033124	*	0	
10	0		-0.0018587	
	292933		4406	

B. Agriculture, Forestry, and Fishing Industry

B.1 Volatility D-in-D Estimation



B.2 Return D-in-D Estimation



B.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0375788	0.0308258	0	0	-1	0.0278302	0.0329532
0	0.0999481	0.1009388	0.0009907	-0.0033506	0	0.1000709	0.101327
1	0.0304371	0.0387895	0	0	1	0.025032	0.0301899
2	0.0296184	0.0259539	0	0	2	0.0240409	0.0207162
3	0.0254468	0.0425176	0.0170708	0	3	0.018591	0.0424719
4	0.0262475	0.0204368	0	0	4	0.0195275	0.0148039
5	0.0262081	0.0386174	0	0	5	0.0180337	0.0423065
6	0.0257538	0.0290603	0	0	6	0.0194332	0.0286052
7	0.0249252	0.0278703	0	0	7	0.0187165	0.0177752
8	0.0244783	0.0213832	0	0	8	0.0172184	0.0204177
9	0.0245278	0.0259949	0	0	9	0.0187038	0.0297353
10	0.0233238	0.0399066	0.0165829	0	10	0.016481	0.0316549
	9800	144				9800	144
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0404533	0.0332653	0	0	-1	0.0323134	0.0360153
0	0.0992013	0.0976567	-0.0015446	-0.0058859	0	0.0995642	0.0965147
1	0.0386088	0.0434133	0	0	1	0.0323716	0.03125
2	0.0349267	0.0322514	0	0	2	0.0267913	0.0328283
3	0.0326241	0.0300013	0	0	3	0.025627	0.0245902
4	0.0321484	0.025349	0	0	4	0.0246741	0.0267983
5	0.0283158	0.0190514	0	0	5	0.0194719	0.0155211
6	0.0319925	0.0359651	0	0	6	0.0244173	0.0378984
7	0.0245317	0.0349732	0	0	7	0.0195577	0.0266247
8	0.0252124	0.0176693	0	0	8	0.018543	0.0119024
9	0.0256639	0.0228761	0	0	9	0.0176056	0.0219864
10	0.0284946	0.0230946	0	0	10	0.0244003	0.0195671
	5619	80				5619	80

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0139985	*	0.0103543	*	0	0
0	0.0999481	*	0.1009388	*	0.0009907	0.0037276
1	0.0072982	*	-0.0253896	*	-0.0326878	-0.0299509
2	-0.0094708	*	-0.0131835	*	0	0
3	-0.0026041	*	-0.0077774	*	0	0
4	-0.0050799	*	0.0052443	*	0	0
5	-0.006302	*	0.0008257	*	0	0
6	-0.0044521	*	-0.0209268	*	0	0
7	-0.0022988	*	0.0130904	*	0	0
8	-0.0024862	*	0.0041375	*	0	0
9	-0.0040732	*	0.0166089	*	0.0206822	0.0234191
10	0.0021753	*	-0.0069407	*	0	0
	9800		144			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0078611	*	0.0116601	*
0	0.1000709	*	0.101327	*
1	0.0059091	*	-0.0272378	*
2	-0.0053191	*	-0.0073126	*
3	0		0.0003535	*
4	-0.0001414	*	0.0039095	*
5	-0.0005917	*	-0.0062857	*
6	0		-0.0268433	*
7	0		0.0012235	*
8	0		0.0063237	*
9	0		0.0256288	*
10	0.0005981	*	-0.0024497	*
	9800		144	

Lower hits (Mean)

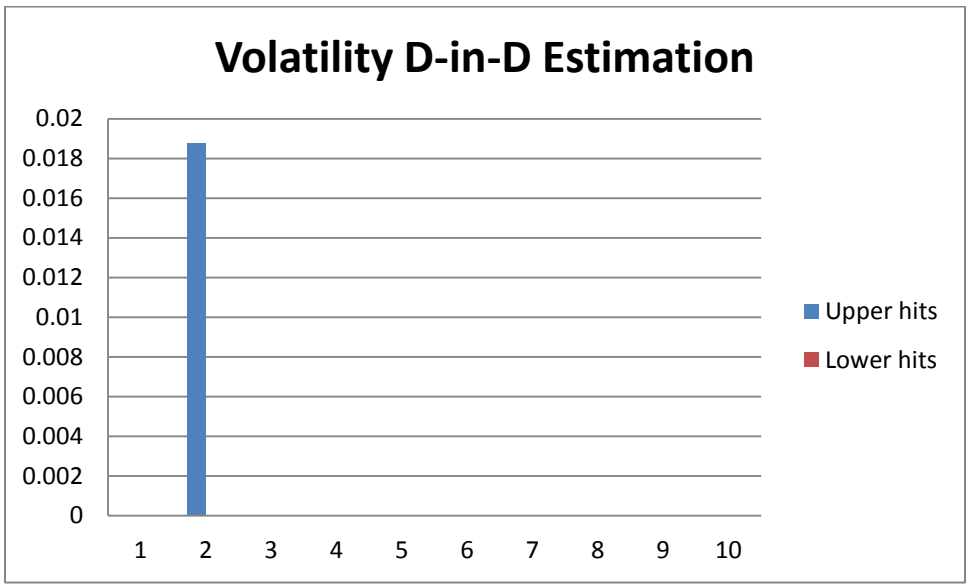
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.015495	*	-0.003867	*	0	0
0	-0.0992013	*	-0.0976567	*	0.0015446	0.0042815
1	0.0045361	*	0.0103918	*	0	0
2	0.0133334	*	-0.0223338	*	-0.0356672	-0.0329303
3	0.0057145	*	0.0176136	*	0	0
4	0.0037776	*	-0.0166909	*	0	0
5	0.0049015	*	0.0032993	*	0	0
6	0.0011697	*	-0.0210561	*	0	0
7	0.0068386	*	0.006163	*	0	0
8	-0.0005495	*	-0.0052823	*	0	0
9	0.0069892	*	-0.0022023	*	0	0
10	0.004088	*	-0.0113227	*	0	0
	5619		80			

Lower hits (Median)

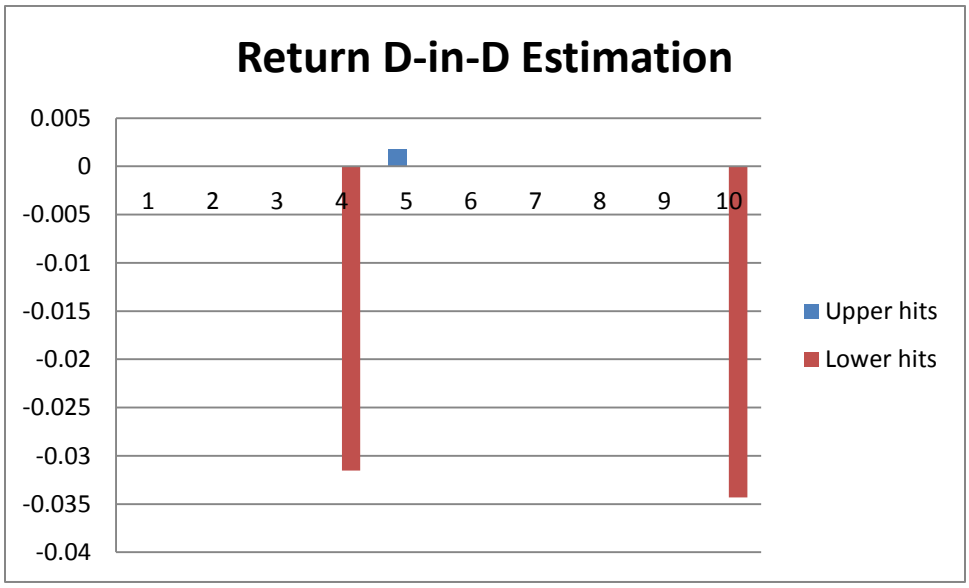
Day	Limit	Significance	No limit	Significance
-1	-0.0103181	*	0.001626	*
0	-0.0995642	*	-0.0965147	*
1	0.0057604	*	0.0257171	*
2	0.008162	*	-0.0291777	*
3	0.0028777	*	0	
4	0		-0.0026667	*
5	0.0012453	*	0	
6	0		0	
7	0.0037703	*	0.0039894	*
8	0		-0.003918	*
9	0.0030753	*	-0.0065104	*
10	0		-0.0120942	*
	5619		80	

C. Mining Industry

C.1 Volatility D-in-D Estimation



C.2 Return D-in-D Estimation



C.3 Volatility Results

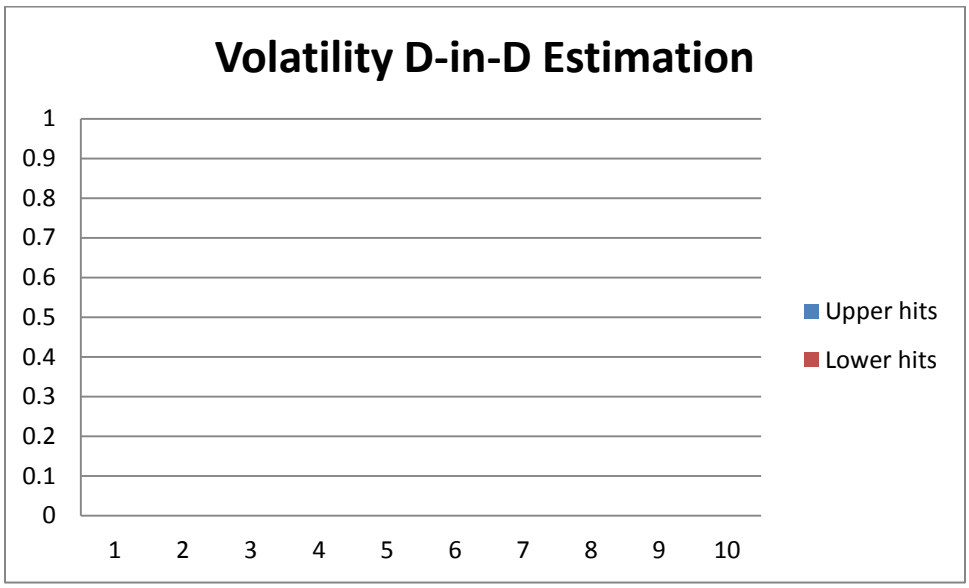
Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0368456	0.0348067	0	0	-1	0.0261898	0.0297723
0	0.0998775	0.0989286	-0.0009489	-0.0035939	0	0.1000523	0.1
1	0.0295599	0.0362206	0	0	1	0.0233083	0.0350515
2	0.0279567	0.0493833	0.0214266	0.0187816	2	0.0216418	0.0519663
3	0.0262117	0.0267877	0	0	3	0.0200212	0.0242718
4	0.0252295	0.0324646	0	0	4	0.0189599	0.0231277
5	0.0234868	0.0237479	0	0	5	0.0171674	0.0133111
6	0.0249767	0.0223469	0	0	6	0.0179502	0.0168971
7	0.0237539	0.0258778	0	0	7	0.0174672	0.0307167
8	0.0226576	0.0276158	0	0	8	0.0159536	0.025933
9	0.0235882	0.0345642	0	0	9	0.0174085	0.0248666
10	0.0242994	0.0277191	0	0	10	0.0172786	0.0223642
	20864	156				20864	156
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0374087	0.0365619	0	0	-1	0.0293191	0.0303458
0	0.0991558	0.0975507	-0.0016051	-0.0042501	0	0.0996076	0.0966575
1	0.0366933	0.0423359	0	0	1	0.0316582	0.0414474
2	0.0356201	0.0267311	0	0	2	0.0291998	0.0085881
3	0.0335489	0.0198803	0	0	3	0.0261224	0.0134149
4	0.0319385	0.0332161	0	0	4	0.0258207	0.0225751
5	0.0282484	0.0406423	0	0	5	0.0199611	0.0426963
6	0.0296265	0.0248345	0	0	6	0.0232919	0.0190464
7	0.0268249	0.0280207	0	0	7	0.0205164	0.0252771
8	0.0270926	0.0382384	0	0	8	0.0209722	0.0397064
9	0.0275332	0.0398025	0	0	9	0.021601	0.0396131
10	0.0283512	0.0343305	0	0	10	0.0215623	0.0290515
	11157	119				11157	119

Upper hits (Mean)							Upper hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	0.0150484	*	0.0159896	*	0	0	-1	0.0070479	*	0.0078864	*
0	0.0998775	*	0.0989286	*	-0.0009489	0.0008255	0	0.1000523	*	0.1	*
1	0.0070404	*	-0.0151733	*	-0.0222136	0	1	0.0054887	*	-0.025254	*
2	-0.0037231	*	0.0098795	*	0	0	2	0		0	
3	-0.0013481	*	-0.0024245	*	0	0	3	0		0.0025682	*
4	-0.0000243	*	-0.0012391	*	0	0	4	0		-0.0051663	*
5	-0.0051081	*	0.0127677	*	0	0.0017744	5	0		0.0111111	*
6	-0.0008783	*	-0.0089006	*	0	0	6	0		-0.0116504	*
7	-0.0033962	*	-0.0087716	*	0	0	7	0		0.0008848	*
8	-0.0013293	*	0.0061445	*	0	0	8	0		0.015163	*
9	-0.0016514	*	0.0024776	*	0	0	9	0		0.0010534	*
10	-0.0000575	*	0.000046	*	0	0	10	0		0.0029099	*
	20864		156					20864		156	

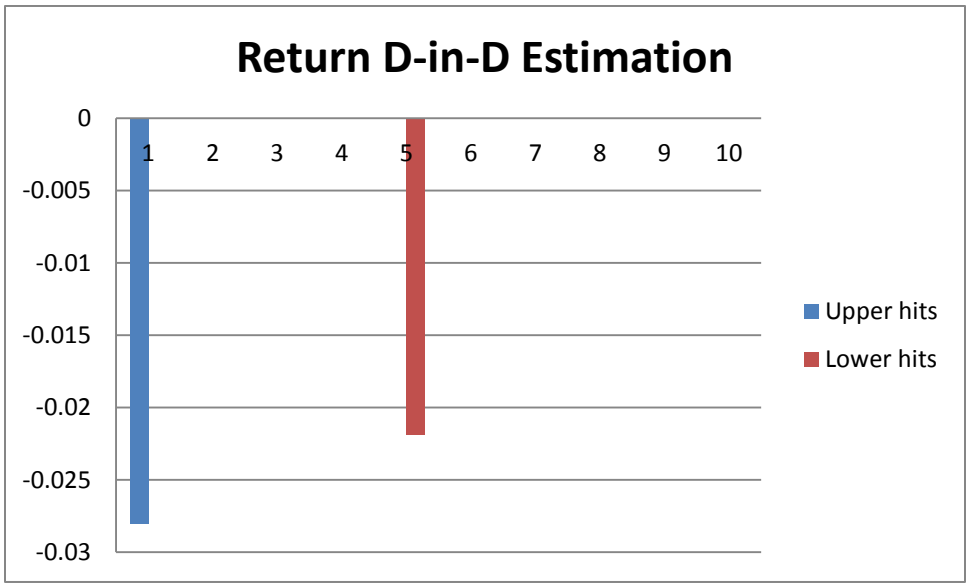
Lower hits (Mean)							Lower hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	-0.0150314	*	0.0131462	*	0	0	-1	-0.0100279	*	0.0059848	*
0	-0.0991558	*	-0.0975507	*	0.0016051	0.0033795	0	-0.0996076	*	-0.0966575	*
1	0.0038873	*	-0.003638	*	0	0	1	0.0065473	*	0.0119205	*
2	0.0091786	*	-0.0141603	*	0	0	2	0.0074789	*	-0.0028896	*
3	0.009005	*	0.0172258	*	0	0	3	0.004131	*	0.0134149	*
4	0.0017075	*	-0.0316013	*	-0.0333088	-0.0315344	4	0.0001915	*	-0.0225751	*
5	0.0065732	*	-0.0160949	*	0	0	5	0.0036819	*	-0.0169346	*
6	-0.0009486	*	0.0034204	*	0	0	6	0		0.0034465	*
7	0.0050029	*	0.0030082	*	0	0	7	0.0030759	*	0.0001083	*
8	-0.0012433	*	-0.0004548	*	0	0	8	0		0.0026142	*
9	0.0097898	*	0.0101448	*	0	0	9	0.0072993	*	0.0144626	*
10	0.0051557	*	-0.0309439	*	-0.0360995	-0.0343251	10	0.0021867	*	-0.0290515	*
	11157		119					11157		119	

D. Construction Industry

D.1 Volatility D-in-D Estimation



D.2 Return D-in-D Estimation



D.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0367765	0.0295795	0	0	-1	0.025697	0.0227553
0	0.0998835	0.0982858	-0.0015977	-0.0055316	0	0.1	0.0983177
1	0.0287378	0.0353566	0	0	1	0.0240038	0.0263014
2	0.0286339	0.0363659	0	0	2	0.0219342	0.0363058
3	0.0259919	0.0286462	0	0	3	0.0190807	0.0254184
4	0.026184	0.0341652	0	0	4	0.0199846	0.0291121
5	0.0240564	0.0218062	0	0	5	0.0170057	0.0169205
6	0.0231052	0.0230509	0	0	6	0.01628	0.0144404
7	0.0239876	0.033231	0	0	7	0.0170939	0.0280561
8	0.0227184	0.0296935	0	0	8	0.0162138	0.0340357
9	0.0238272	0.0345414	0.0107142	0	9	0.0169617	0.0251713
10	0.0232438	0.0266482	0	0	10	0.0182019	0.0232238
	15370	254				15370	254
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0380393	0.0314123	0	0	-1	0.0307399	0.0314092
0	0.0991126	0.0980801	-0.0010325	-0.0049664	0	0.0995345	0.098283
1	0.0345022	0.0321426	0	0	1	0.0288161	0.0216678
2	0.0314875	0.0311268	0	0	2	0.0259861	0.0350195
3	0.0313327	0.0230597	0	0	3	0.0259984	0.0164448
4	0.0298666	0.0318905	0	0	4	0.0231869	0.0308725
5	0.0273198	0.0331235	0	0	5	0.0178944	0.0230415
6	0.0284121	0.0251339	0	0	6	0.020934	0.0195853
7	0.0273957	0.0284256	0	0	7	0.0212248	0.0188014
8	0.0242824	0.0295086	0	0	8	0.0179723	0.02113
9	0.0271705	0.0341952	0	0	9	0.0189461	0.0296788
10	0.0263395	0.0358446	0	0	10	0.0214824	0.0335163
	8963	153				8963	153

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0144618	*	0.0033284	*	0	0
0	0.0998835	*	0.0982859	*	-0.0015977	0.0010816
1	0.0063739	*	-0.0243362	*	-0.03071	-0.0280307
2	-0.0081685	*	-0.015457	*	0	0
3	-0.0038938	*	0.0021479	*	0	0
4	-0.0030655	*	-0.0002908	*	0	0
5	-0.0053984	*	-0.0019428	*	0	0
6	-0.0034352	*	-0.0022911	*	0	0
7	-0.0022068	*	-0.0037993	*	0	0
8	-0.0017224	*	-0.002895	*	0	0
9	-0.0019875	*	0.0076272	*	0	0
10	-0.0000397	*	-0.0074561	*	0	0
	15370		254			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0075382	*	0.0037832	*
0	0.1	*	0.0983177	*
1	0.0048632	*	-0.0237069	*
2	-0.002994	*	-0.0189274	*
3	0		0	
4	0		0	
5	0		0	
6	0		0	
7	0		-0.001328	*
8	0		-0.0106383	*
9	0		0.0062992	*
10	0		-0.0159497	*
	15370		254	

Lower hits (Mean)

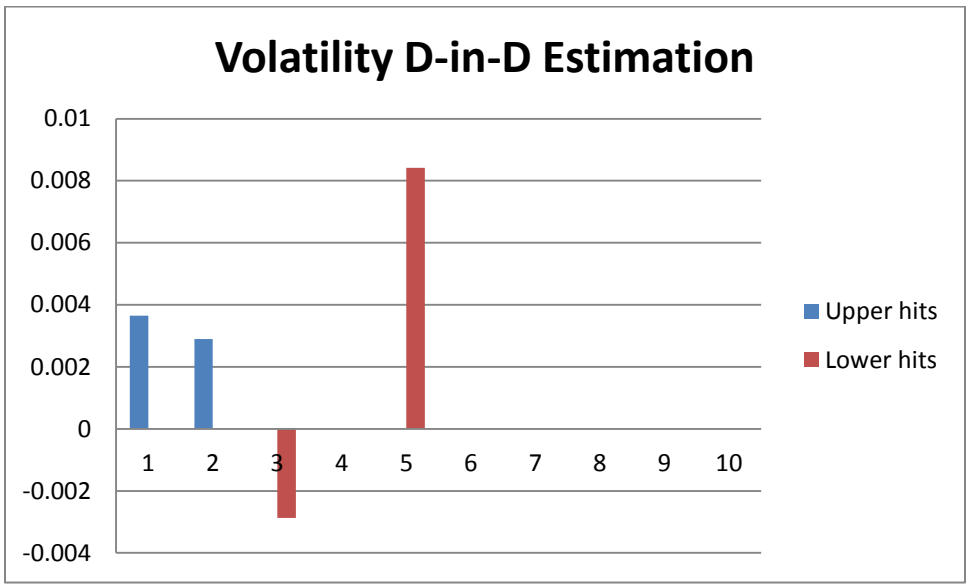
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0143246	*	-0.0035825	*	0	0
0	-0.0991126	*	-0.0980801	*	0.0010325	0.0037118
1	0.0001434	*	-0.0007145	*	0	0
2	0.0065981	*	-0.0016785	*	0	0
3	0.0073502	*	-0.011594	*	0	0
4	0.004447	*	-0.0059586	*	0	0
5	0.0077812	*	-0.0167895	*	-0.0245707	-0.0218914
6	0.0034476	*	-0.0060191	*	0	0
7	0.0068362	*	-0.0061045	*	0	0
8	-0.0001516	*	0.0139593	*	0	0
9	0.0063103	*	0.0073315	*	0	0
10	0.0055079	*	0.0072368	*	0	0
	8963		153			

Lower hits (Median)

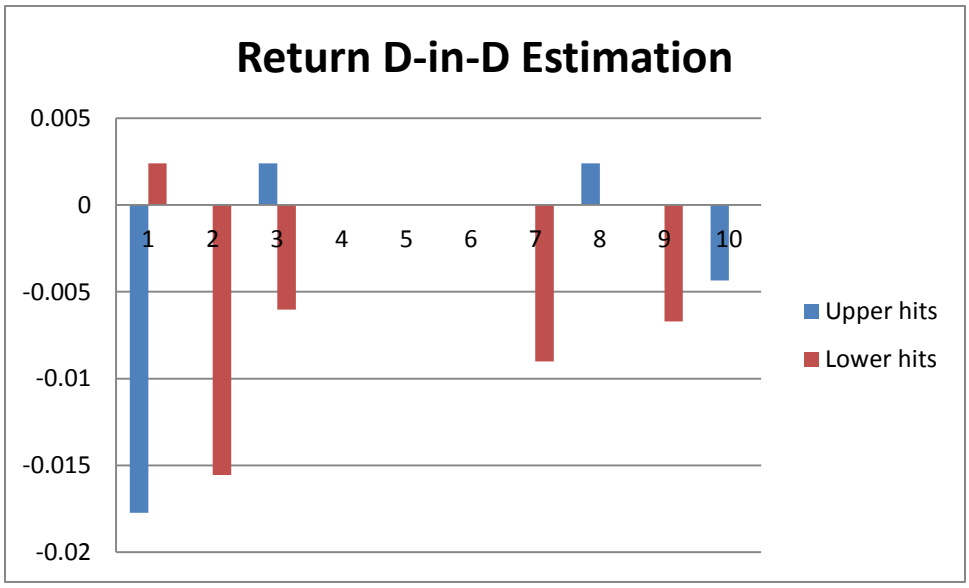
Day	Limit	Significance	No limit	Significance
-1	-0.0076068	*	-0.0005252	*
0	-0.0995345	*	-0.098283	*
1	0.0021993	*	-0.003314	*
2	0.0063401	*	-0.0047626	*
3	0.0039663	*	-0.0132931	*
4	0.0015613	*	0.0023215	*
5	0.0043757	*	0.0028902	*
6	0.0012474	*	-0.0038425	*
7	0.004125	*	-0.0009381	*
8	0		0.0098253	*
9	0.0030591	*	0.015601	*
10	0.0013726	*	0.0044292	*
	8963		153	

E. Manufacturing Industry

E.1 Volatility D-in-D Estimation



E.2 Return D-in-D Estimation



E.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0367948	0.033046	-0.0037488	-0.0066197	-1	0.0274674	0.027027
0	0.0998477	0.0990413	-0.0008064	-0.0036773	0	0.1	0.0989247
1	0.0303391	0.0368623	0.0065232	0.0036523	1	0.0253025	0.0331721
2	0.0291426	0.0349121	0.0057695	0.0028986	2	0.0226522	0.0300591
3	0.0261581	0.0310928	0.0049347	0	3	0.019314	0.0271739
4	0.0259398	0.0305088	0.004569	0	4	0.0198886	0.0253759
5	0.0243768	0.0282202	0.0038435	0	5	0.0178512	0.0228571
6	0.0232934	0.0272372	0.0039438	0	6	0.0166205	0.0223464
7	0.023712	0.02693	0.003218	0	7	0.0176264	0.0209991
8	0.0238566	0.0248309	0	0	8	0.017363	0.0181406
9	0.0228534	0.027086	0.0042326	0	9	0.0162162	0.0205128
10	0.022768	0.025812	0.003044	0	10	0.0169202	0.0214215
	317892	4872				317892	4872
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0389809	0.0375028	0	0	-1	0.0300981	0.0327869
0	0.0991165	0.0978067	-0.0013098	-0.0041807	0	0.0995554	0.0978951
1	0.0359776	0.0387212	0	0	1	0.0301904	0.0349801
2	0.031859	0.0360596	0.0042006	0	2	0.0251799	0.0356621
3	0.0309671	0.0276244	0	-0.0028709	3	0.0254477	0.0212264
4	0.0313129	0.0351401	0	0	4	0.0245747	0.0295617
5	0.0275924	0.038886	0.0112936	0.0084227	5	0.019656	0.0334928
6	0.0289599	0.0296794	0	0	6	0.0215341	0.0243572
7	0.027305	0.0334248	0.0061198	0	7	0.0207222	0.0288367
8	0.0263191	0.0315783	0.0052592	0	8	0.020632	0.0255034
9	0.027131	0.0314878	0.0043568	0	9	0.0200555	0.0279972
10	0.0274068	0.0306099	0	0	10	0.0213025	0.0238612
	186223	2210				186223	2210

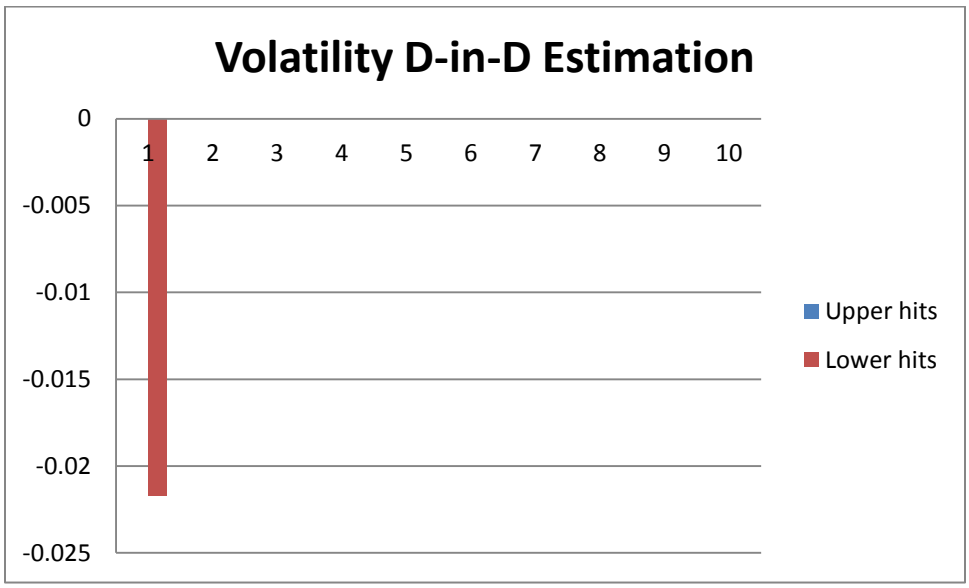
Daily Returns

Upper hits (Mean)							Upper hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	0.0133156	*	0.0001759	*	-0.0131398	-0.0107399	-1	0.0067799	*	0	
0	0.0998477	*	0.0990413	*	-0.0008064	0.0015935	0	0.1	*	0.0989247	*
1	0.0067614	*	-0.0133712	*	-0.0201326	-0.0177327	1	0.0053648	*	-0.0172895	*
2	-0.0079338	*	-0.0122465	*	-0.0043127	0	2	-0.0035461	*	-0.0131938	*
3	-0.0024276	*	-0.0006349	*	0	0.0023999	3	0		0.001544	*
4	-0.0021126	*	-0.0014064	*	0	0	4	0		-0.0017026	*
5	-0.0049296	*	-0.0073085	*	0	0	5	0		-0.0087912	*
6	-0.0019823	*	-0.0043243	*	0	0	6	0		-0.0032747	*
7	-0.0009038	*	-0.0019274	*	0	0	7	0		-0.0009396	*
8	-0.0021256	*	0.0005289	*	0	0.0023999	8	0		0.0015723	*
9	-0.0021308	*	-0.0022345	*	0	0	9	0		-0.0020465	*
10	0.0006501	*	-0.0061056	*	-0.0067558	-0.0043559	10	0		-0.0028569	*
	317892		4872					317892		4872	

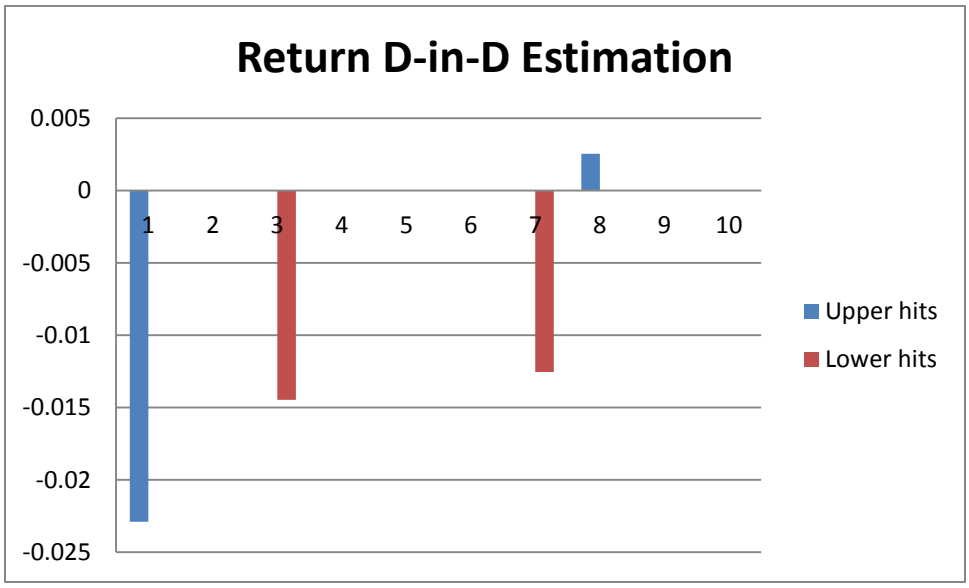
Lower hits (Mean)							Lower hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	-0.0149399	*	0.0006005	*	0.0155403	0.0179402	-1	-0.0077436	*	-0.0012563	*
0	-0.0991165	*	-0.0978067	*	0.0013098	0.0037097	0	-0.0995554	*	-0.0978951	*
1	0.0013527	*	0.0058229	*	0	0.0023999	1	0.0026774	*	0.0021625	*
2	0.0071054	*	-0.0108361	*	-0.0179415	-0.0155416	2	0.0046028	*	-0.0063463	*
3	0.007177	*	-0.0012549	*	-0.008432	-0.0060321	3	0.0047923	*	-0.0012547	*
4	0.0041512	*	0.0014107	*	0	0	4	0.0014104	*	0.0029608	*
5	0.0054354	*	-0.0023399	*	-0.0077753	0	5	0.0029101	*	0	
6	0.0025058	*	-0.0020642	*	0	0	6	0.001666	*	-0.0010309	*
7	0.0070676	*	-0.0043454	*	-0.011413	-0.0090131	7	0.0036733	*	-0.0030219	*
8	0.001122	*	0.0012818	*	0	0	8	0		0	
9	0.0074583	*	-0.001642	*	-0.0091003	-0.0067004	9	0.0033003	*	0	
10	0.004405	*	0.0045574	*	0	0	10	0		0.0038536	*
	186223		2210					186223		2210	

F. Transportation, Communications, Electric, Gas, and Sanitary Services Industry

F.1 Volatility D-in-D Estimation



F.2 Return D-in-D Estimation



F.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.037309	0.0278238	-0.0094852	-0.0131633	-1	0.0278854	0.0220002
0	0.0998623	0.0984809	-0.0013814	-0.0050595	0	0.100028	0.097561
1	0.029457	0.0331593	0	0	1	0.0244361	0.0294464
2	0.0282946	0.0369548	0.0086601	0	2	0.0207161	0.0326087
3	0.0261866	0.030096	0	0	3	0.019363	0.0243353
4	0.025364	0.0285712	0	0	4	0.0193706	0.0287425
5	0.0234035	0.0220053	0	0	5	0.0162413	0.018018
6	0.0231067	0.0275797	0	0	6	0.0154987	0.024914
7	0.023059	0.0282084	0	0	7	0.0163714	0.0215924
8	0.0227597	0.0275604	0	0	8	0.0159263	0.0214545
9	0.0224736	0.0234736	0	0	9	0.0154972	0.0162547
10	0.022471	0.0248861	0	0	10	0.0162059	0.0145349
	42850	778				42850	778
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0390974	0.0438914	0	0	-1	0.0309886	0.0459723
0	0.0991497	0.097228	-0.0019217	-0.0055998	0	0.0995813	0.0969479
1	0.0384663	0.0204292	-0.0180371	-0.0217152	1	0.0335165	0.0158371
2	0.0324353	0.0415797	0.0091444	0	2	0.0258493	0.0438111
3	0.0312278	0.0355596	0	0	3	0.0252577	0.0370497
4	0.0307695	0.0307304	0	0	4	0.0235131	0.0271576
5	0.0291479	0.0285191	0	0	5	0.0201343	0.0197077
6	0.0283972	0.0269043	0	0	6	0.0197091	0.0185056
7	0.027591	0.0322609	0	0	7	0.0211988	0.0263594
8	0.0274744	0.023139	0	0	8	0.0211666	0.0147954
9	0.0262783	0.031483	0	0	9	0.018484	0.0239112
10	0.0267925	0.0248743	0	0	10	0.0205362	0.0228758
	25072	411				25072	411

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0119331	*	0.0002483	*	-0.0116848	0
0	0.0998623	*	0.0984809	*	-0.0013814	0.0011472
1	0.0059535	*	-0.0194555	*	-0.0254089	-0.0228803
2	-0.0087572	*	-0.0154253	*	0	0
3	-0.0015692	*	0.0020012	*	0	0
4	-0.0008302	*	-0.0032521	*	0	0
5	-0.0055704	*	-0.0004946	*	0	0
6	-0.0022776	*	0.0020104	*	0	0
7	-0.0008548	*	0.0031125	*	0	0
8	-0.0017293	*	0.0041377	*	0	0.0025286
9	-0.001811	*	0.0018837	*	0	0
10	0.0000547	*	-0.0033634	*	0	0
	42850		778			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.005677	*	0.0100197	*
0	0.100028	*	0.097561	*
1	0.0039651	*	-0.0240306	*
2	-0.0042876	*	-0.0184667	*
3	0		0.0015032	*
4	0		-0.0063492	*
5	0		0.0036101	*
6	0		0.0011253	*
7	0		0.0010254	*
8	0		0	
9	0		0.0016116	*
10	0		0	
	42850		778	

Lower hits (Mean)

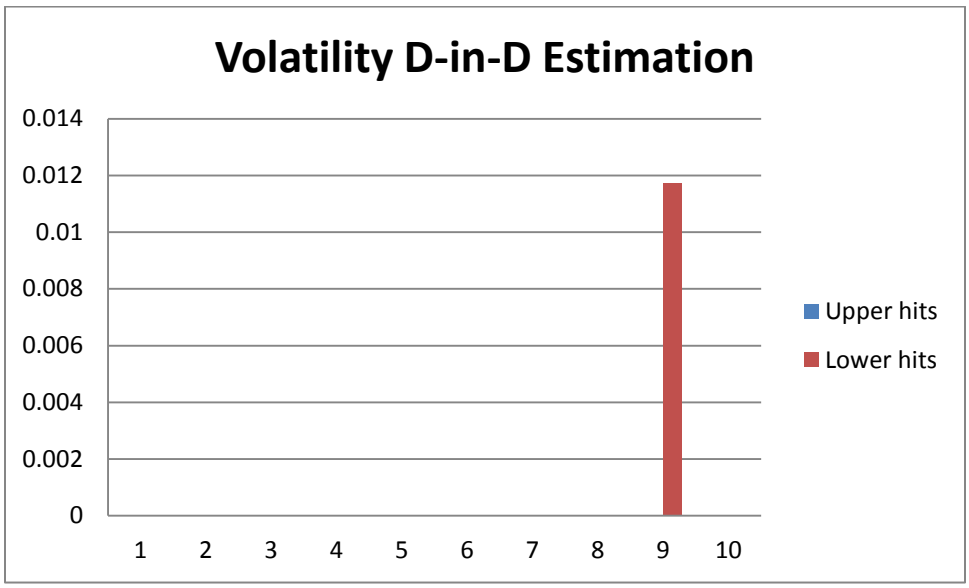
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0161335	*	-0.0033761	*	0	0
0	-0.0991497	*	-0.097228	*	0.0019217	0.0044503
1	0.0053972	*	0.0004644	*	0	0
2	0.0048606	*	-0.0076079	*	0	0
3	0.0071152	*	-0.0098807	*	-0.0169959	-0.0144673
4	0.0028333	*	-0.0097513	*	0	0
5	0.0065899	*	0.000266	*	0	0
6	0.0042432	*	0.0055093	*	0	0
7	0.0073751	*	-0.0076911	*	-0.0150663	-0.0125377
8	-0.0012209	*	0.005605	*	0	0
9	0.0087931	*	0.0045226	*	0	0
10	0.0061692	*	-0.0013881	*	0	0
	25072		411			

Lower hits (Median)

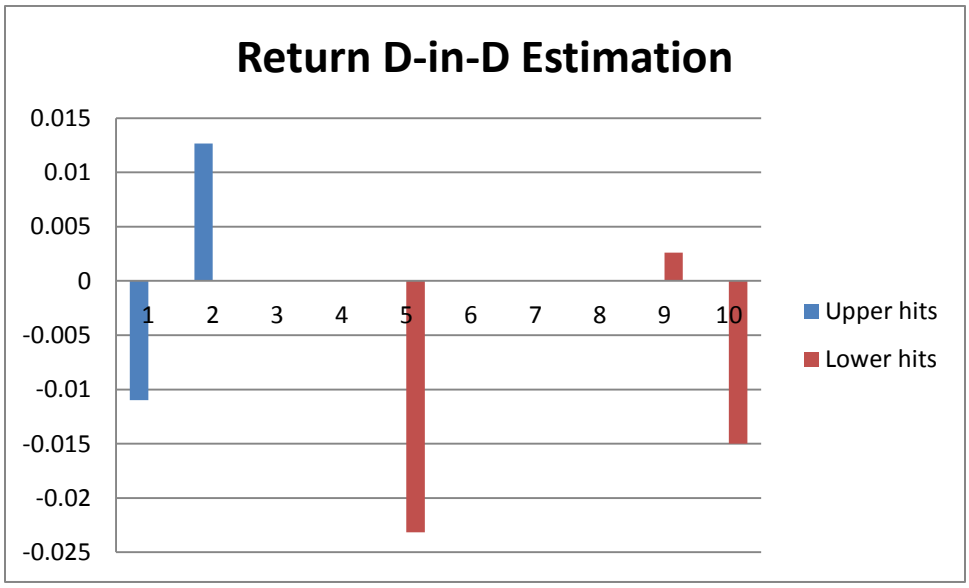
Day	Limit	Significance	No limit	Significance
-1	-0.0081177	*	-0.0009772	*
0	-0.0995813	*	-0.0969479	*
1	0.0067243	*	0.0012376	*
2	0.0036389	*	-0.0072072	*
3	0.0047962	*	-0.0138992	*
4	0.0008244	*	-0.0070529	*
5	0.0036991	*	0.0102448	*
6	0.003096	*	-0.0036836	*
7	0.004634	*	0.0023256	*
8	0		0.0036047	*
9	0.0038866	*	0.0082781	*
10	0.0016772	*	0	
	25072		411	

G. Wholesale Trade Industry

G.1 Volatility D-in-D Estimation



G.2 Return D-in-D Estimation



G.3 Volatility Results

Volatility

Upper hits (Mean)

Day	Limit	No limit	Difference	D-in-D
-1	0.0386322	0.0301202	-0.008512	-0.0121098
0	0.0998694	0.0993917	-0.0004777	-0.0040755
1	0.0306088	0.0380647	0.0074559	0
2	0.0296325	0.0322366	0	0
3	0.0268902	0.0285781	0	0
4	0.0270706	0.031638	0	0
5	0.0242343	0.0256286	0	0
6	0.0245298	0.0286866	0	0
7	0.0233571	0.0239787	0	0
8	0.0245106	0.0275877	0	0
9	0.0226424	0.0228231	0	0
10	0.0228611	0.0306165	0.0077554	0
	28573	714		

Upper hits (Median)

Day	Limit	No limit
-1	0.0291411	0.0255639
0	0.1	0.099232
1	0.025564	0.0350895
2	0.0226313	0.0265734
3	0.0195745	0.023514
4	0.0209141	0.0268905
5	0.0172872	0.0185185
6	0.0172693	0.0253566
7	0.0175779	0.0187474
8	0.0177628	0.0236864
9	0.0160618	0.0187995
10	0.0170272	0.0212622
	28573	714

Lower hits (Mean)

Day	Limit	No limit	Difference	D-in-D
-1	0.0409077	0.0322022	0	-0.0035978
0	0.0991229	0.0975306	-0.0015923	-0.0051901
1	0.0366338	0.0385981	0	0
2	0.0327631	0.031244	0	0
3	0.0326877	0.028834	0	0
4	0.0313834	0.0412035	0	0
5	0.0271124	0.0359844	0	0
6	0.0282785	0.0366114	0	0
7	0.0278816	0.0256028	0	0
8	0.026403	0.0271787	0	0
9	0.025656	0.0409898	0.0153338	0.011736
10	0.0272587	0.0392237	0.0119649	0
	17084	346		

Lower hits (Median)

Day	Limit	No limit
-1	0.031519	0.0286094
0	0.0995685	0.0975936
1	0.0314497	0.0326761
2	0.0258621	0.0194286
3	0.0266763	0.021813
4	0.0234377	0.0376662
5	0.0192859	0.0338164
6	0.0205818	0.0342412
7	0.022228	0.0208333
8	0.0206612	0.0174788
9	0.0187244	0.0316797
10	0.0201207	0.0303195
	17084	346

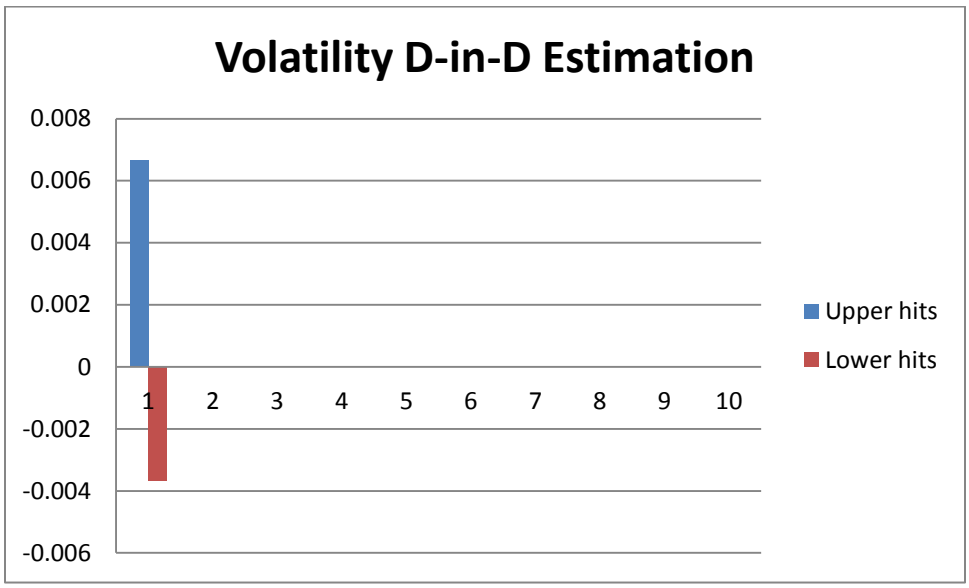
Daily Returns

Upper hits (Mean)							Upper hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	0.0147931	*	-0.0008375	*	-0.0156306	-0.013026	-1	0.0089571	*	0	
0	0.0998694	*	0.0993917	*	-0.0004777	0.0021269	0	0.1	*	0.099232	*
1	0.005314	*	-0.0082866	*	-0.0136006	-0.010996	1	0.0029589	*	-0.0086206	*
2	-0.0073988	*	0.0026506	*	0.0100494	0.012654	2	-0.0025524	*	0.0017406	*
3	-0.0033991	*	0.0031126	*	0	0	3	0		0	
4	-0.0026413	*	-0.0015163	*	0	0	4	0		0	
5	-0.0058651	*	-0.0045924	*	0	0	5	0		0	
6	-0.0013233	*	0.0020153	*	0	0	6	0		0.0002623	*
7	-0.0012972	*	-0.0026118	*	0	0	7	0		-0.0012829	*
8	-0.0009543	*	0.0015223	*	0	0	8	0		-0.0029326	*
9	-0.0024811	*	-0.0042835	*	0	0	9	0		-0.0081951	*
10	0.0006054	*	-0.0015649	*	0	0	10	0		-0.0121269	*
	28573		714					28573		714	

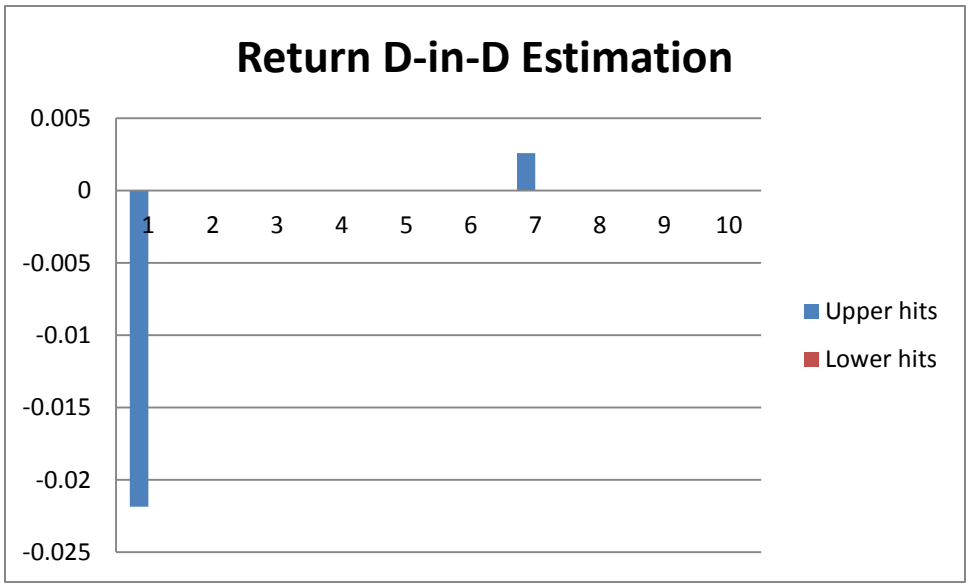
Lower hits (Mean)							Lower hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	-0.0171868	*	0.0022557	*	0.0194425	0.0220471	-1	-0.0090226	*	-0.0007893	*
0	-0.0991229	*	-0.0975306	*	0.0015923	0.0041969	0	-0.0995685	*	-0.0975936	*
1	0.0037676	*	-0.0037262	*	0	0	1	0.0057471	*	-0.002457	*
2	0.0064621	*	0.0125777	*	0	0	2	0.0034227	*	0.0013726	*
3	0.0084344	*	-0.0021784	*	0	0	3	0.0085796	*	0.0035588	*
4	0.0038093	*	0.0154481	*	0	0	4	0.0007952	*	0.0212766	*
5	0.0055893	*	-0.0201684	*	-0.0257577	-0.0231531	5	0.003356	*	-0.0169919	*
6	0.0031948	*	-0.0003676	*	0	0	6	0.0007311	*	0.0037549	*
7	0.0061707	*	-0.002107	*	0	0	7	0.0028853	*	0	
8	0.0016768	*	-0.0089352	*	0	0	8	0		-0.003967	*
9	0.007229	*	0.0200837	*	0	0.0026046	9	0.0020843	*	0.0167574	*
10	0.0038904	*	-0.013698	*	-0.0175884	-0.0149838	10	0		-0.0115534	*
	17084		346					17084		346	

H. Retail Trade Industry

H.1 Volatility D-in-D Estimation



H.2 Return D-in-D Estimation



H.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0365	0.0367294	0	0	-1	0.027284	0.0314754
0	0.099859	0.0993537	-0.0005054	-0.0041609	0	0.1000294	0.0992622
1	0.0295382	0.0398485	0.0103103	0.0066548	1	0.0246809	0.037037
2	0.0293741	0.0368704	0.0074963	0	2	0.0231368	0.0322714
3	0.0262835	0.0266189	0	0	3	0.0196464	0.0220174
4	0.0253503	0.0269447	0	0	4	0.0190983	0.0241518
5	0.0252536	0.0295331	0	0	5	0.0194807	0.0236686
6	0.0230422	0.023703	0	0	6	0.0166887	0.0189189
7	0.0231558	0.0254374	0	0	7	0.017071	0.017331
8	0.0230671	0.0300377	0.0069706	0	8	0.017037	0.0236686
9	0.0220652	0.0239698	0	0	9	0.0150323	0.019171
10	0.0212909	0.0274346	0.0061437	0	10	0.0151794	0.0207661
	24541	873				24541	873

Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0407759	0.03493	0	-0.0036555	-1	0.0329662	0.0272183
0	0.0991608	0.0978326	-0.0013282	-0.0049837	0	0.0996276	0.0979856
1	0.03648	0.0327418	0	-0.0036555	1	0.0317116	0.0250815
2	0.0318331	0.0299278	0	0	2	0.0246037	0.0249036
3	0.0313858	0.0308869	0	0	3	0.0259585	0.0224909
4	0.0309783	0.0390281	0.0080499	0	4	0.0251524	0.0374857
5	0.0279718	0.035379	0	0	5	0.0202215	0.0292799
6	0.0283829	0.026626	0	0	6	0.0216431	0.0211901
7	0.0272692	0.0309933	0	0	7	0.0212458	0.0284883
8	0.0257985	0.0359097	0.0101112	0	8	0.0204986	0.0323269
9	0.0266521	0.0339263	0	0	9	0.0196249	0.0287674
10	0.0257594	0.0338999	0.0081405	0	10	0.0194835	0.0260083
	14378	594				14378	594

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0139792	*	0.0025314	*	-0.0114478	0
0	0.099859	*	0.0993537	*	-0.0005054	0.0020684
1	0.0066172	*	-0.0178065	*	-0.0244237	-0.0218499
2	-0.0075234	*	-0.0188022	*	-0.0112788	0
3	-0.0034748	*	-0.0026796	*	0	0
4	-0.0008054	*	-0.0028029	*	0	0
5	-0.0049197	*	-0.0007793	*	0	0
6	-0.0001288	*	-0.0043903	*	0	0
7	-0.0020105	*	0.0050536	*	0	0.0025738
8	-0.0019511	*	-0.0015562	*	0	0
9	-0.00179	*	-0.0023341	*	0	0
10	0.0009408	*	-0.0039093	*	0	0
	24541		873			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0055698	*	0.0046838	*
0	0.1000294	*	0.0992622	*
1	0.0051661	*	-0.0276364	*
2	-0.0020146	*	-0.0180007	*
3	0		0	
4	0		0	
5	-0.0005311	*	0	
6	0		-0.0064856	*
7	0		0.001632	*
8	0		0	
9	0		0.0014406	*
10	0		-0.0033285	*
	24541		873	

Lower hits (Mean)

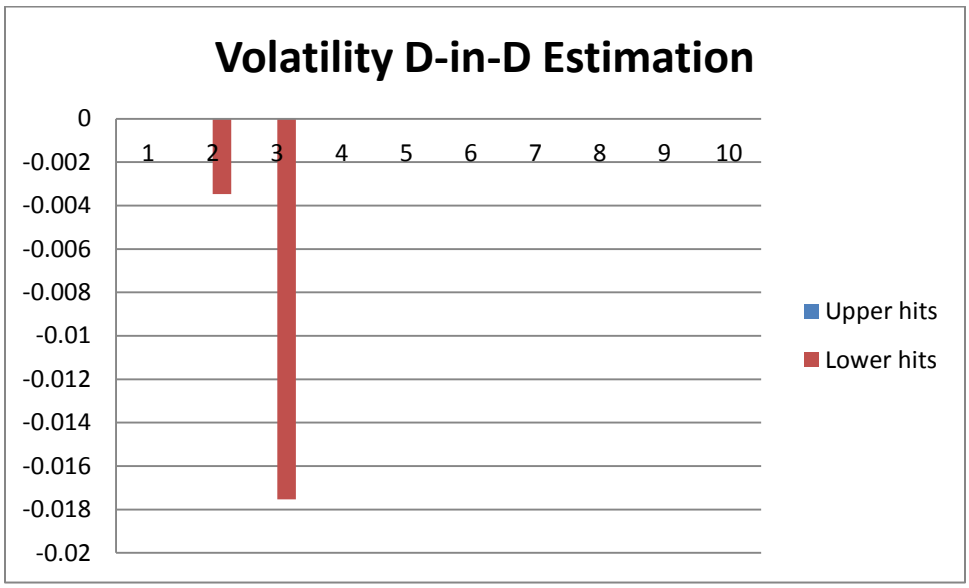
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0147105	*	0.0041375	*	0.018848	0.0214218
0	-0.0991608	*	-0.0978326	*	0.0013282	0.003902
1	0.0046916	*	0.0012607	*	0	0
2	0.005549	*	-0.0000399	*	0	0
3	0.0079606	*	0.010015	*	0	0
4	0.0039305	*	0.001242	*	0	0
5	0.0067383	*	-0.0004582	*	0	0
6	0.003595	*	-0.0069572	*	0	0
7	0.0083846	*	0.0026944	*	0	0
8	-0.0009262	*	-0.0027252	*	0	0
9	0.0077136	*	-0.0018023	*	0	0
10	0.0050423	*	-0.005351	*	-0.0103933	0
	14378		594			

Lower hits (Median)

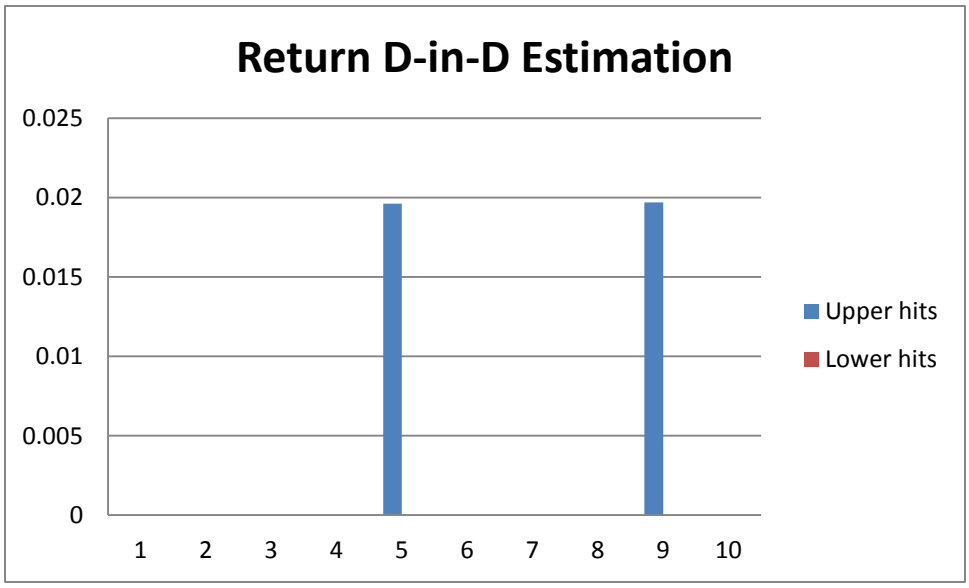
Day	Limit	Significance	No limit	Significance
-1	-0.006989	*	-0.0012227	*
0	-0.0996276	*	-0.0979856	*
1	0.0061095	*	0.0010141	*
2	0.0034314	*	0.0002528	*
3	0.0053599	*	0.0084061	*
4	0.0008403	*	0.0021974	*
5	0.0035047	*	-0.0022065	*
6	0.0007092	*	-0.0042788	*
7	0.0042206	*	0.0048791	*
8	0		0	
9	0.004142	*	-0.0082638	*
10	0		-0.0094393	*
	14378		594	

I. Finance, Insurance, and Real Estate Industry

I.1 Volatility D-in-D Estimation



I.2 Return D-in-D Estimation



I.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0395498	0.0279087	0	-0.0034764	-1	0.0298507	0.0224957
0	0.099846	0.0993529	0	-0.0034764	0	0.1	0.0990545
1	0.0294535	0.0288566	0	0	1	0.024065	0.0200836
2	0.027952	0.0364847	0	0	2	0.0208733	0.0293811
3	0.0259932	0.0373783	0.0113851	0	3	0.0188278	0.0367356
4	0.0257549	0.0277949	0	0	4	0.0197869	0.0207471
5	0.0238	0.0255672	0	0	5	0.0178938	0.020232
6	0.0232332	0.028539	0	0	6	0.0166042	0.0255185
7	0.0228822	0.0289184	0	0	7	0.0166394	0.0267956
8	0.023343	0.0218892	0	0	8	0.017432	0.0194028
9	0.0216474	0.030897	0.0092496	0	9	0.0149083	0.0240799
10	0.023812	0.0294076	0	0	10	0.0164417	0.0219615
	17538	264				17538	264
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0374523	0.0249615	0	-0.0034764	-1	0.0288754	0.0228471
0	0.0992024	0.0978492	-0.0013533	-0.0048297	0	0.0996255	0.097673
1	0.0357415	0.0416864	0	0	1	0.0298103	0.0341727
2	0.0316254	0.0224796	0	-0.0034764	2	0.0239974	0.015493
3	0.0314421	0.0173895	-0.0140526	-0.017529	3	0.0244199	0.0115876
4	0.0327709	0.0344923	0	0	4	0.026248	0.0279181
5	0.0306765	0.0287259	0	0	5	0.0217938	0.0254095
6	0.0270096	0.0275964	0	0	6	0.0195312	0.0187406
7	0.0280815	0.0220909	0	0	7	0.0224111	0.0147035
8	0.0298114	0.0281144	0	0	8	0.0236643	0.0231793
9	0.0272014	0.0332099	0	0	9	0.0204728	0.027177
10	0.0266266	0.039073	0.0124464	0	10	0.0204675	0.0313987
	9344	247				9344	247

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0152298	*	0.0142256	*	0	0
0	0.099846	*	0.0993529	*	0	0.0024891
1	0.0051415	*	-0.0050768	*	0	0
2	-0.0045353	*	-0.010151	*	0	0
3	-0.0027186	*	0.0022797	*	0	0
4	-0.0011173	*	-0.0079409	*	0	0
5	-0.0055414	*	0.0115766	*	0.017118	0.0196071
6	-0.0014097	*	-0.0051007	*	0	0
7	-0.0009168	*	0.0022382	*	0	0
8	-0.0010133	*	-0.0148514	*	-0.0138381	0
9	-0.0019456	*	0.015254	*	0.0171996	0.0196887
10	-0.002305	*	-0.0117825	*	0	0
	17538		264			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0063656	*	0.009585	*
0	0.1	*	0.0990545	*
1	0.0031373	*	0	
2	-0.001036	*	-0.0219635	*
3	0		0.00129	*
4	0		-0.0097107	*
5	0		0.0112392	*
6	0		-0.0028107	*
7	0		0.0055911	*
8	0		-0.0138009	*
9	0		0.013583	*
10	0		-0.01263	*
	17538		264	

Lower hits (Mean)

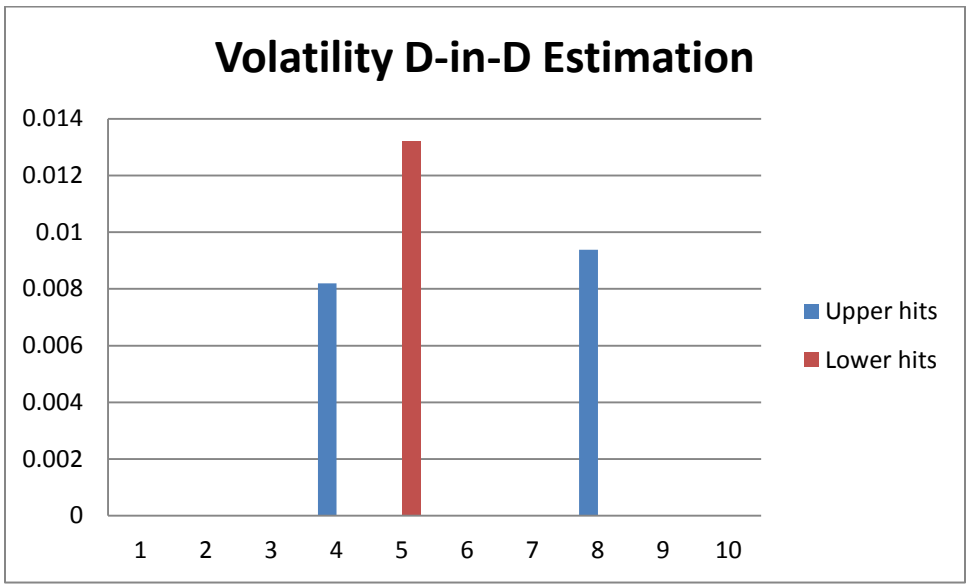
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0163152	*	0.0075065	*	0.0238218	0.0263109
0	-0.0992024	*	-0.0978492	*	0.0013533	0.0038424
1	0.0016439	*	-0.0079215	*	0	0
2	0.0023716	*	-0.0050922	*	0	0
3	0.0085467	*	0.0019477	*	0	0
4	0.0035352	*	-0.0090943	*	0	0
5	0.0089582	*	0.000647	*	0	0
6	0.0054534	*	-0.0069904	*	0	0
7	0.0059032	*	-0.0133919	*	-0.0192951	0
8	0.0016881	*	-0.0005243	*	0	0
9	0.0058736	*	0.0003753	*	0	0
10	0.0039304	*	-0.0043104	*	0	0
	9344		247			

Lower hits (Median)

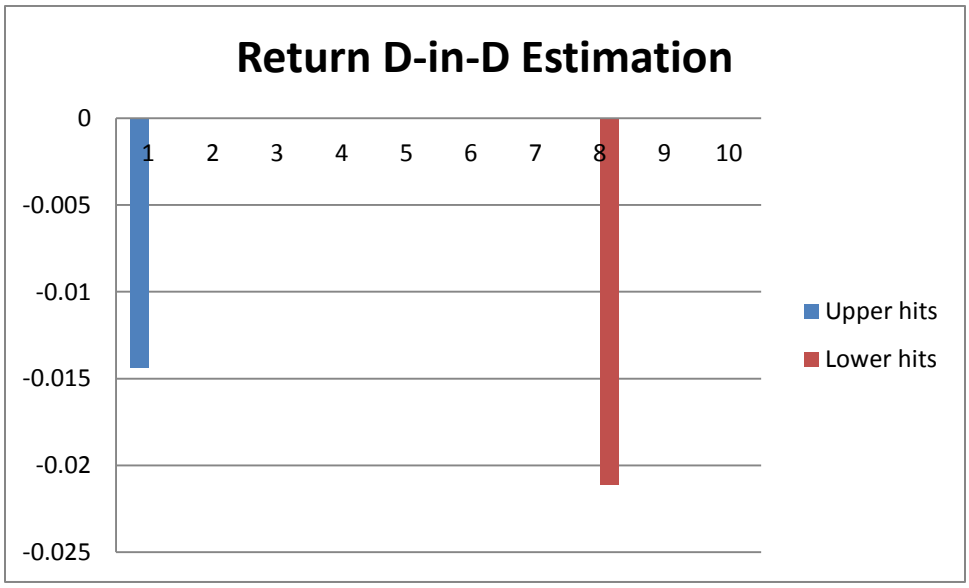
Day	Limit	Significance	No limit	Significance
-1	-0.008642	*	0	
0	-0.0996255	*	-0.097673	*
1	0.0010848	*	0.0008396	*
2	0.0005283	*	0.0009804	*
3	0.0042272	*	-0.0009794	*
4	0.0014208	*	-0.0046838	*
5	0.0055479	*	0.0032362	*
6	0.0000612	*	0	
7	0.0021978	*	-0.0062565	*
8	0		0	
9	0.0012046	*	0.0034369	*
10	0		-0.0241098	*
	9344		247	

J. Services Industry

J.1 Volatility D-in-D Estimation



J.2 Return D-in-D Estimation



J.3 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0374513	0.0325862	0	0	-1	0.0284404	0.0244541
0	0.0998354	0.0988505	-0.0009849	-0.0043614	0	0.1	0.098578
1	0.0313383	0.0364844	0	0	1	0.026294	0.0353931
2	0.0287602	0.0347344	0	0	2	0.0218409	0.030126
3	0.0267866	0.0220093	0	0	3	0.0194095	0.0175965
4	0.0259888	0.0375592	0.0115704	0.0081939	4	0.0199368	0.037253
5	0.0246639	0.0233574	0	0	5	0.0187166	0.0129397
6	0.0230715	0.0256772	0	0	6	0.0164514	0.0293454
7	0.0244282	0.0276938	0	0	7	0.01875	0.0215385
8	0.0228622	0.0356214	0.0127591	0.0093826	8	0.0167598	0.0279633
9	0.0219182	0.0266286	0	0	9	0.0156454	0.0219416
10	0.0225608	0.0250511	0	0	10	0.015891	0.0178486
	25740	402				25740	402
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0371964	0.0294169	0	0	-1	0.0281451	0.0168545
0	0.0991448	0.0983428	-0.0008019	-0.0041784	0	0.0996467	0.0993485
1	0.0342136	0.026236	0	0	1	0.028352	0.0165913
2	0.0304389	0.0309803	0	0	2	0.0239492	0.0313531
3	0.0301	0.0312013	0	0	3	0.024289	0.0272
4	0.0302758	0.0351773	0	0	4	0.0242578	0.0302548
5	0.0268488	0.0434291	0.0165803	0.0132038	5	0.0195503	0.0380368
6	0.0264494	0.0252758	0	0	6	0.0196078	0.0211257
7	0.0257508	0.0378461	0	0	7	0.0197775	0.0354878
8	0.0257051	0.0369346	0	0	8	0.0199253	0.0344481
9	0.0264588	0.0244456	0	0	9	0.0192503	0.0192689
10	0.0250046	0.0353143	0	0	10	0.018559	0.0266309
	14487	198				14487	198

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0141144	*	0.0050601	*	0	0
0	0.0998354	*	0.0988505	*	-0.0009849	0.0019597
1	0.0068248	*	-0.01051	*	-0.0173348	-0.0143902
2	-0.0074638	*	-0.0147634	*	0	0
3	-0.0051263	*	-0.0096421	*	0	0
4	-0.0013727	*	0.0006583	*	0	0
5	-0.0056862	*	-0.0015951	*	0	0
6	-0.0026009	*	-0.0007107	*	0	0
7	-0.0020415	*	-0.0053308	*	0	0
8	-0.0008942	*	0.0005452	*	0	0
9	-0.0012274	*	0.0011371	*	0	0
10	0.0003293	*	-0.0057384	*	0	0
	25740		402			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0063393	*	0.0054645	*
0	0.1	*	0.098578	*
1	0.0057754	*	-0.0141486	*
2	-0.0024752	*	-0.0168273	*
3	0		-0.0020804	*
4	0		0.0070764	*
5	-0.0009885	*	-0.0019685	*
6	0		0	
7	0		0.0006035	*
8	0		-0.0011148	*
9	0		0.0017182	*
10	0		-0.0068715	*
	25740		402	

Lower hits (Mean)

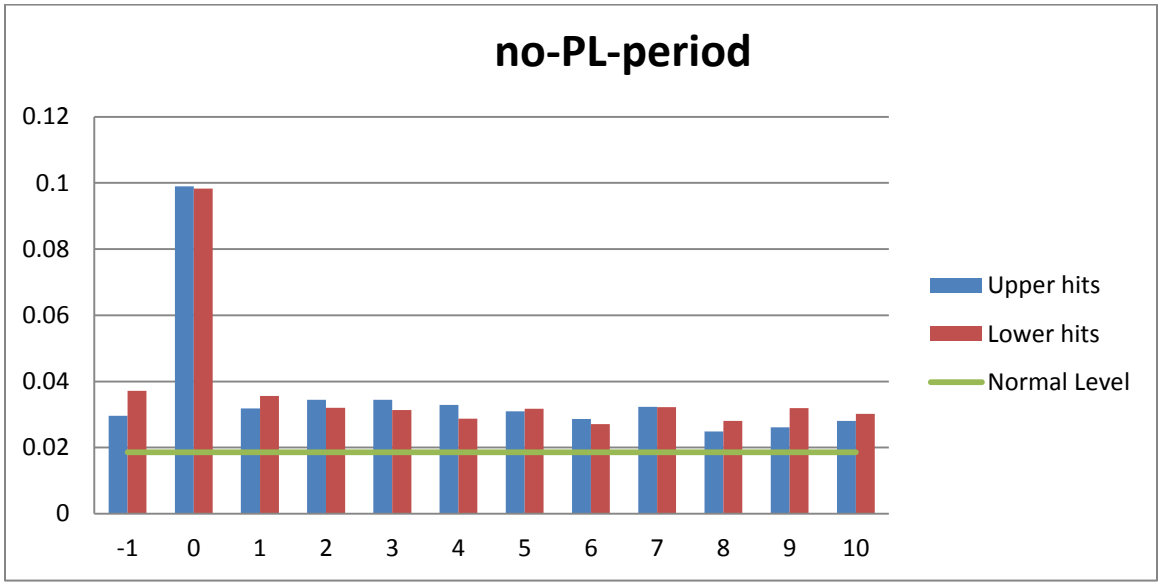
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0124683	*	-0.0145033	*	0	0
0	-0.0991448	*	-0.0983428	*	0.0008019	0.0037465
1	-0.0002026	*	0.0076223	*	0	0
2	0.0055628	*	-0.0031774	*	0	0
3	0.0060043	*	0.0065441	*	0	0
4	0.0026073	*	0.0057612	*	0	0
5	0.004505	*	-0.0116913	*	0	0
6	0.0022597	*	-0.0054878	*	0	0
7	0.0061429	*	0.0092149	*	0	0
8	0.0027076	*	-0.0213193	*	-0.0240269	-0.0210823
9	0.0055584	*	-0.002144	*	0	0
10	0.0028856	*	0.0036035	*	0	0
	14487		198			

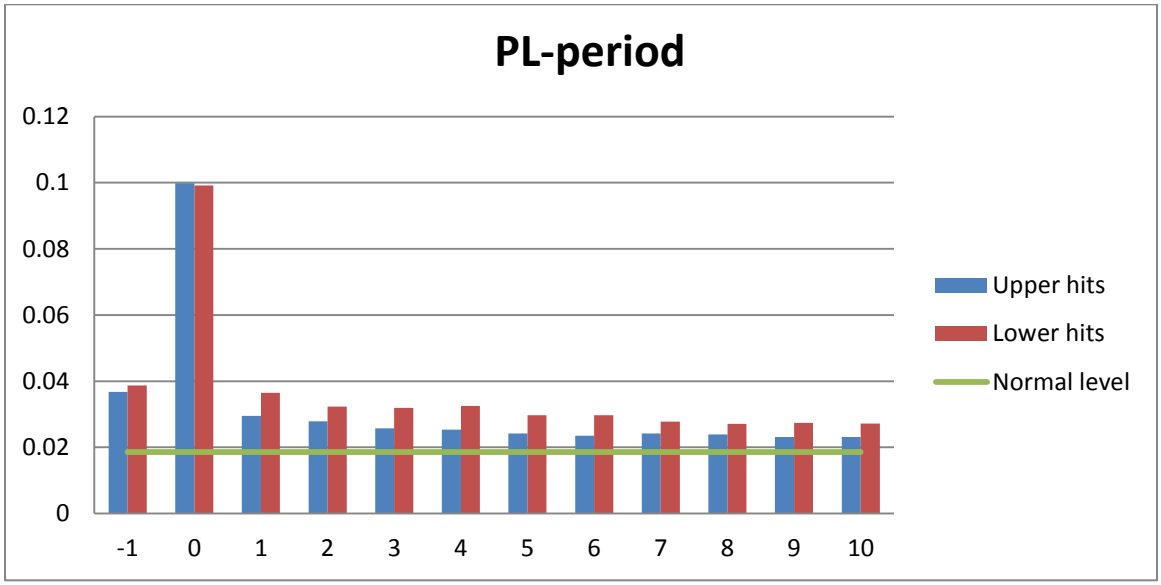
Lower hits (Median)

Day	Limit	Significance	No limit	Significance
-1	-0.0059885	*	0	
0	-0.0996467	*	-0.0993485	*
1	0.0013743	*	0.0121547	*
2	0.0034241	*	-0.0012232	*
3	0.0040671	*	0.0018939	*
4	0		0.0008696	*
5	0.0010753	*	0	
6	0.0005325	*	0.0017953	*
7	0.0025284	*	0.0084329	*
8	0		-0.0244623	*
9	0.001846	*	-0.0087692	*
10	0		-0.0043872	*
	14487		198	

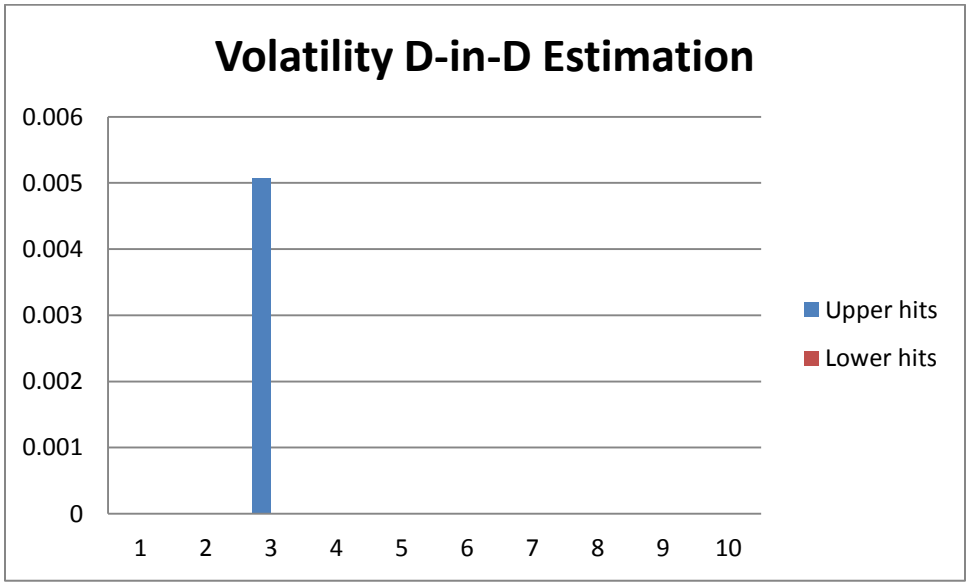
K. Large Cap Stocks

K.1 Back to "Normal"

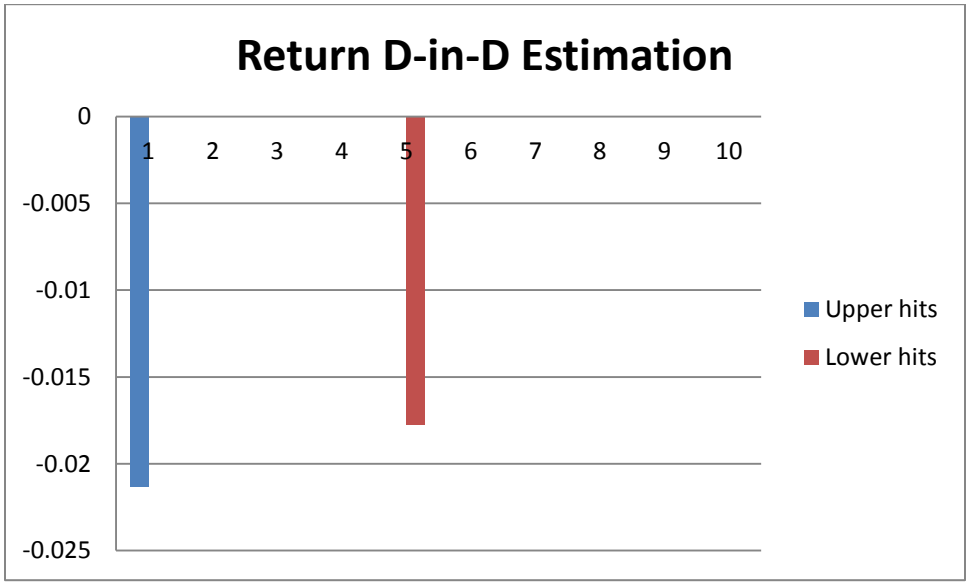




K.2 Volatility D-in-D Estimation



K.3 Return D-in-D Estimation



K.4 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0367472	0.02965	0	-0.0036731	-1	0.0266841	0.0236036
0	0.099868	0.0989882	-0.0008798	-0.0045529	0	0.100029	0.09889
1	0.0294946	0.031889	0	0	1	0.0240222	0.0267677
2	0.0278881	0.0344427	0.0065546	0	2	0.0212465	0.0282777
3	0.0257398	0.0344843	0.0087445	0.0050714	3	0.0187927	0.0301095
4	0.0253603	0.0329503	0.00759	0	4	0.0192029	0.0255351
5	0.0241938	0.0310018	0.006808	0	5	0.0172212	0.0290284
6	0.0235375	0.028657	0.0051195	0	6	0.0166226	0.0229446
7	0.0241648	0.0323691	0.0082044	0	7	0.017893	0.0279214
8	0.0238745	0.0248744	0	0	8	0.0173141	0.0170195
9	0.0231335	0.0261332	0	0	9	0.0164883	0.0196213
10	0.0230956	0.0280985	0.0050029	0	10	0.0168526	0.0219807
	274293	1113				274293	1113
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0386754	0.0371356	0	0	-1	0.0293933	0.031118
0	0.0991303	0.0983086	-0.0008217	-0.0044948	0	0.0995861	0.0983796
1	0.0365065	0.0355717	0	0	1	0.0309898	0.025851
2	0.0323114	0.0320094	0	0	2	0.025451	0.0157233
3	0.0319671	0.0313486	0	0	3	0.0261718	0.0313286
4	0.0324773	0.0287883	0	0	4	0.0252713	0.0195754
5	0.0297435	0.0317179	0	0	5	0.0215707	0.0239442
6	0.0296758	0.0270648	0	0	6	0.022137	0.0155729
7	0.0277849	0.0322396	0	0	7	0.0209038	0.0247562
8	0.0271404	0.0280603	0	0	8	0.0212184	0.0214729
9	0.0274218	0.0319227	0	0	9	0.0194895	0.0280496
10	0.0272304	0.0302443	0	0	10	0.020782	0.0224618
	142158	473				142158	473

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0149137	*	0.00017	*	-0.0147437	-0.0127795
0	0.099868	*	0.0989882	*	-0.0008798	0.0010844
1	0.0077009	*	-0.0156021	*	-0.0233029	-0.0213387
2	-0.0052416	*	-0.0083089	*	0	0
3	-0.0013535	*	-0.0047501	*	0	0
4	-0.0008692	*	0.0018879	*	0	0
5	-0.0047659	*	-0.0065966	*	0	0
6	-0.0021293	*	-0.0044539	*	0	0
7	-0.0009457	*	0.0032273	*	0	0
8	-0.0020311	*	0.0020515	*	0	0
9	-0.0022364	*	0.0023326	*	0	0
10	0.0010231	*	-0.0062527	*	-0.0072759	0
	274293		1113			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0073171	*	0.0012336	*
0	0.100029	*	0.09889	*
1	0.0060216	*	-0.01069	*
2	-0.0007179	*	-0.0094578	*
3	0		-0.0011862	*
4	0		-0.0029904	*
5	0		-0.0077402	*
6	0		-0.005138	*
7	0		0.0029806	*
8	0		0.0011905	*
9	0		0.0003232	*
10	0		-0.0112612	*
	274293		1113	

Lower hits (Mean)

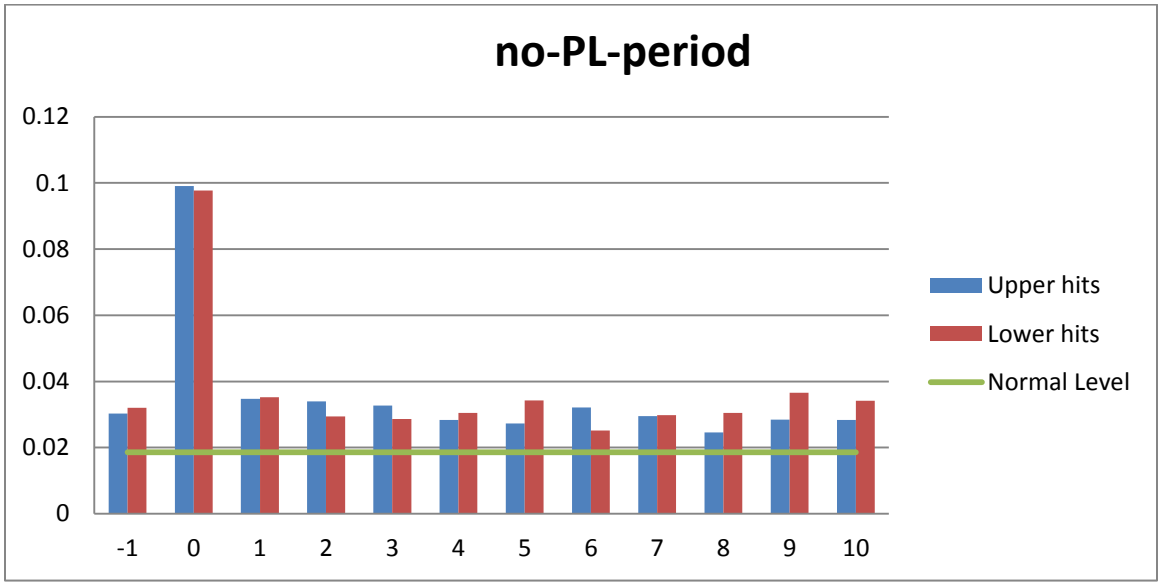
Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0157632	*	0.0067713	*	0.0225345	0.0244987
0	-0.0991303	*	-0.0983086	*	0.0008217	0.0027859
1	0.0025925	*	0.0136915	*	0	0
2	0.0077048	*	-0.0038724	*	0	0
3	0.0076305	*	0.0045894	*	0	0
4	0.0052518	*	0.0006836	*	0	0
5	0.0085721	*	-0.0111211	*	-0.0196933	-0.0177291
6	0.0033744	*	-0.0099434	*	-0.0133178	0
7	0.0057102	*	-0.0061292	*	-0.0118394	0
8	0.0010015	*	-0.0015388	*	0	0
9	0.0075024	*	0.0088497	*	0	0
10	0.0045834	*	0.0058852	*	0	0
	142158		473			

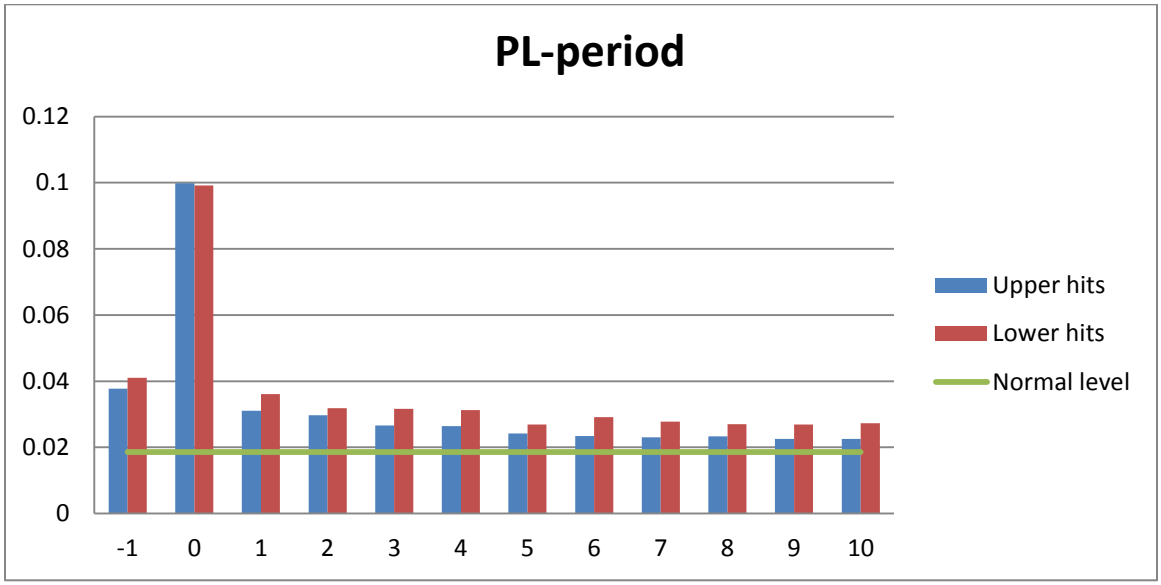
Lower hits (Median)

Day	Limit	Significance	No limit	Significance
-1	-0.0080126	*	-0.0010466	*
0	-0.0995861	*	-0.0983796	*
1	0.0035686	*	0.0057904	*
2	0.0057715	*	-0.0034783	*
3	0.0044679	*	0.0081916	*
4	0.0025556	*	0.0005488	*
5	0.0056269	*	-0.0072254	*
6	0.0021044	*	-0.0096386	*
7	0.0026923	*	-0.0026455	*
8	0		0.0012195	*
9	0.0031675	*	-0.0002676	*
10	0.0009185	*	0.0042159	*
	142158		473	

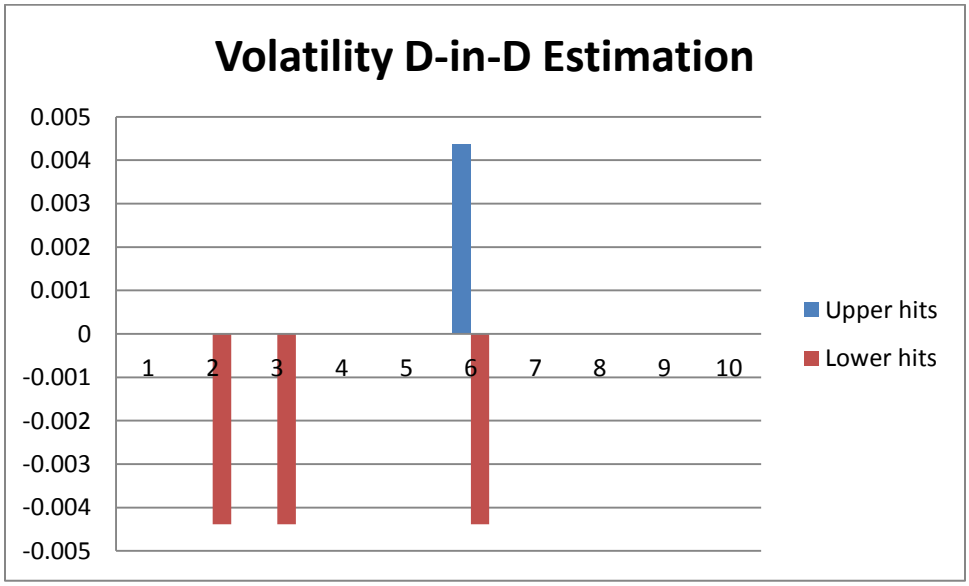
L. Mid Cap Stocks

L.1 Back to “Normal”

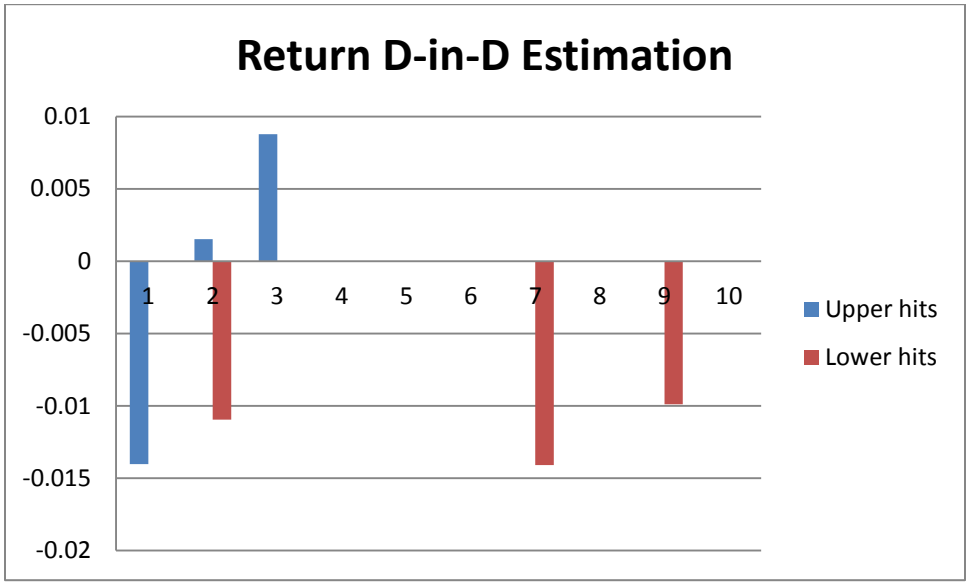




L.2 Volatility D-in-D Estimation



L.3 Return D-in-D Estimation



L.4 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0377942	0.0303073	-0.0074869	-0.0118707	-1	0.0288886	0.0242695
0	0.0998399	0.0991111	-0.0007288	-0.0051126	0	0.1	0.0987345
1	0.0311046	0.0347795	0	0	1	0.0262505	0.0294811
2	0.0297389	0.033931	0.0041921	0	2	0.0230555	0.0303911
3	0.0265887	0.0327455	0.0061568	0	3	0.0195151	0.0312744
4	0.0264189	0.0283492	0	0	4	0.0203997	0.023909
5	0.0242077	0.0272702	0	0	5	0.0180944	0.0209572
6	0.0233831	0.0321196	0.0087364	0.0043526	6	0.0164317	0.0287128
7	0.023091	0.0295367	0.0064457	0	7	0.016932	0.0236451
8	0.0233806	0.0245521	0	0	8	0.0170213	0.0194346
9	0.0225158	0.0284891	0.0059733	0	9	0.0156454	0.0206897
10	0.0225421	0.0283562	0.0058141	0	10	0.0167927	0.0227162
	157145	1814				157145	1814
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0410271	0.0319982	-0.0090289	-0.0134127	-1	0.0329494	0.0249627
0	0.0991455	0.0977459	-0.0013996	-0.0057834	0	0.0995671	0.0976615
1	0.0361501	0.0351984	0	0	1	0.0305874	0.0345613
2	0.0318778	0.0294566	0	-0.0043838	2	0.0251613	0.0208158
3	0.0316235	0.0286197	0	-0.0043838	3	0.0262175	0.0237576
4	0.0313053	0.0304548	0	0	4	0.024909	0.0247386
5	0.0268849	0.0342287	0.0073438	0	5	0.0185371	0.0258901
6	0.0291079	0.0252058	0	-0.0043838	6	0.0214095	0.0196078
7	0.0277583	0.0298584	0	0	7	0.0216076	0.0230005
8	0.0270518	0.0304482	0	0	8	0.0212766	0.0287595
9	0.0268696	0.0365624	0.0096929	0	9	0.0202563	0.0338371
10	0.0273171	0.03415	0.0068329	0	10	0.02125	0.0309047
	97059	890				97059	890

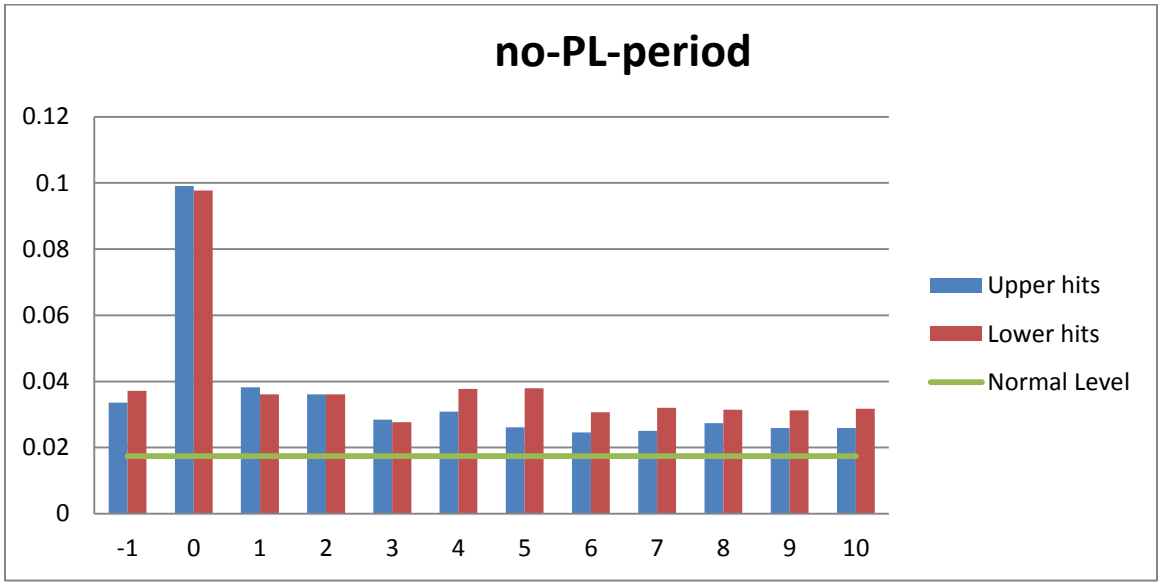
Daily Returns

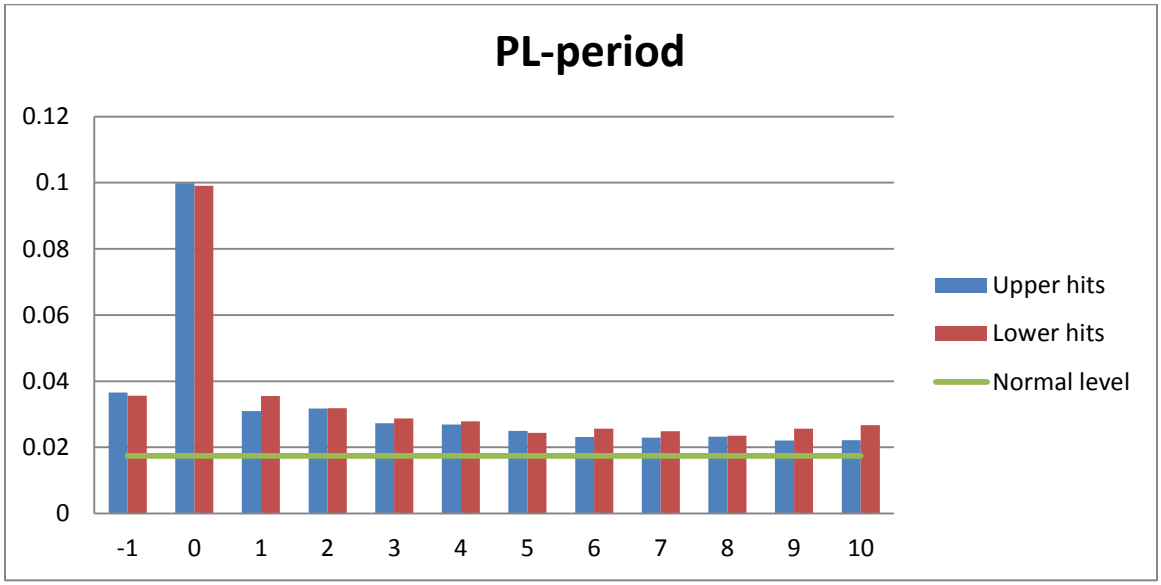
Upper hits (Mean)							Upper hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	0.0134857	*	0.0097842	*	0	0	-1	0.0074757	*	0.0072105	*
0	0.0998399	*	0.0991111	*	-0.0007288	0.000791	0	0.1	*	0.0987345	*
1	0.0058355	*	-0.0097041	*	-0.0155396	-0.0140198	1	0.0042916	*	-0.0092056	*
2	-0.0096946	*	-0.0046309	*	0	0.0015198	2	-0.0055905	*	-0.007112	*
3	-0.004191	*	0.0030551	*	0.0072461	0.0087659	3	0		0.0057986	*
4	-0.0026676	*	0.0006302	*	0	0	4	0		-0.0004957	*
5	-0.005384	*	-0.0020002	*	0	0	5	0		-0.0012834	*
6	-0.0014102	*	-0.0046384	*	0	0	6	0		-0.0072148	*
7	-0.0010293	*	-0.0069005	*	-0.0058712	0	7	0		-0.0078638	*
8	-0.0019354	*	-0.0053946	*	0	0	8	0		-0.0011268	*
9	-0.001699	*	0.001715	*	0	0	9	0		-0.0022091	*
10	-0.0003394	*	-0.0025881	*	0	0	10	0		-0.0034792	*
	157145		1814					157145		1814	

Lower hits (Mean)							Lower hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	-0.015731	*	-0.0006825	*	0.0150484	0.0165682	-1	-0.0087732	*	-0.001227	*
0	-0.0991455	*	-0.0977459	*	0.0013996	0.0029194	0	-0.0995671	*	-0.0976615	*
1	0.0017705	*	0.008114	*	0	0	1	0.0041645	*	0.0059053	*
2	0.0070283	*	-0.0054386	*	-0.0124669	-0.0109471	2	0.0048701	*	-0.0013316	*
3	0.0075354	*	0.0075075	*	0	0	3	0.0056349	*	0.0056055	*
4	0.0046631	*	0.0005669	*	0	0	4	0.0016812	*	0.0009789	*
5	0.0045076	*	-0.0041515	*	0	0	5	0.0022051	*	0.0042958	*
6	0.0022106	*	-0.0021618	*	0	0	6	0.0010747	*	-0.0050505	*
7	0.0075597	*	-0.0080437	*	-0.0156034	-0.0140836	7	0.0046041	*	-0.0057899	*
8	0.0008929	*	0.0041066	*	0	0	8	0		0.0037388	*
9	0.0068402	*	-0.0045582	*	-0.0113984	-0.0098786	9	0.0030391	*	-0.0115473	*
10	0.0045007	*	0.0044465	*	0	0	10	0		0.0018512	*
	97059		890					97059		890	

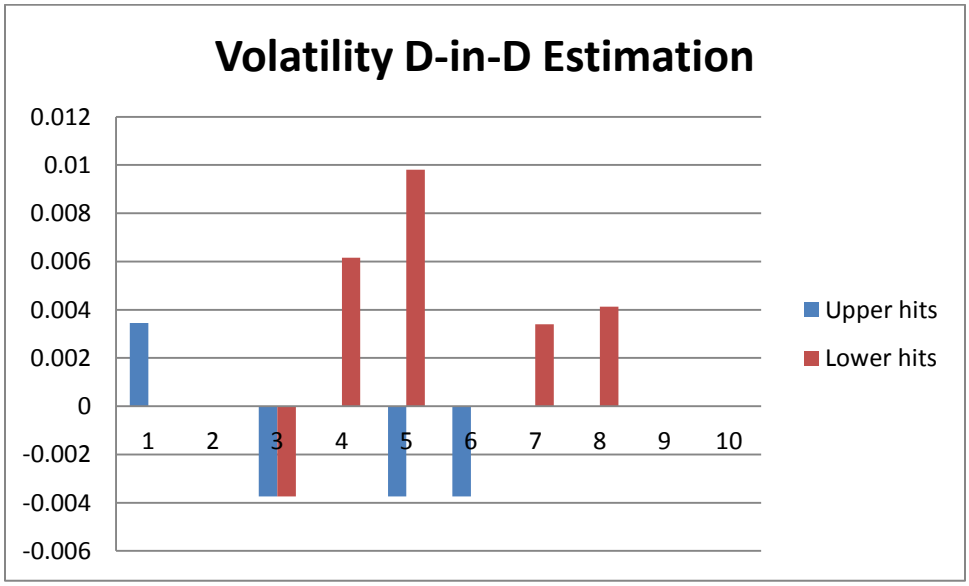
M. Small Cap Stocks

M.1 Back to “Normal”

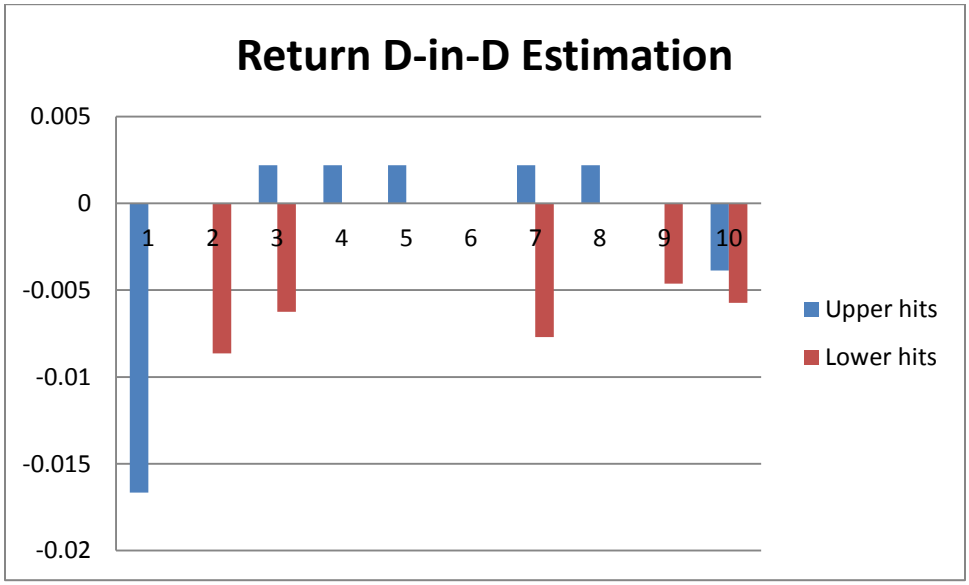




M.2 Volatility D-in-D Estimation



M.3 Return D-in-D Estimation



M.4 Volatility Results

Volatility							
	Upper hits (Mean)					Upper hits (Median)	
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0366101	0.0336145	-0.0029956	-0.0067365	-1	0.0277778	0.0273607
0	0.0998292	0.0990326	-0.0007966	-0.0045375	0	0.1	0.09888
1	0.0309991	0.0381889	0.0071898	0.0034489	1	0.0266191	0.0348202
2	0.0317527	0.0360572	0.0043045	0	2	0.0249785	0.0315789
3	0.0273324	0.0284959	0	-0.0037409	3	0.0209937	0.023514
4	0.0269134	0.0308527	0.0039393	0	4	0.0207702	0.0268966
5	0.0250228	0.0261383	0	-0.0037409	5	0.019011	0.0203046
6	0.023167	0.0245883	0	-0.0037409	6	0.0170584	0.0200669
7	0.0229347	0.0250286	0	0	7	0.0176056	0.0199031
8	0.023204	0.0273552	0.0041511	0	8	0.0167015	0.0220441
9	0.0220359	0.0259829	0.003947	0	9	0.0157233	0.0200582
10	0.0221847	0.0259831	0.0037984	0	10	0.0162602	0.0205405
	72479	5661				72479	5661
	Lower hits (Mean)					Lower hits (Median)	
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0356545	0.0371759	0	0	-1	0.028686	0.0344844
0	0.0990995	0.0976849	-0.0014146	-0.0051555	0	0.0995316	0.0977528
1	0.0354894	0.036079	0	0	1	0.0299864	0.0298282
2	0.03184	0.0360632	0.0042231	0	2	0.0256616	0.0356621
3	0.0287106	0.0277008	0	-0.0037409	3	0.0230352	0.0216181
4	0.0278849	0.0377888	0.0099039	0.006163	4	0.0220467	0.0332031
5	0.0243596	0.0379005	0.0135409	0.0098	5	0.0168917	0.0340557
6	0.0256361	0.0306924	0.0050562	0	6	0.0185709	0.0253877
7	0.0249194	0.0320591	0.0071398	0.0033989	7	0.0193638	0.0277778
8	0.023564	0.0314387	0.0078747	0.0041338	8	0.0176211	0.0251142
9	0.0256267	0.0312679	0.0056413	0	9	0.0195744	0.0276784
10	0.0266823	0.031771	0.0050887	0	10	0.0209228	0.0251618
	53656	3043				53656	3043

Daily Returns

Upper hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	0.0093176	*	-0.0004186	*	-0.0097363	-0.0075399
0	0.0998292	*	0.0990326	*	-0.0007966	0.0013998
1	0.0034598	*	-0.0153886	*	-0.0188485	-0.0166521
2	-0.0129314	*	-0.0148203	*	0	0
3	-0.0039779	*	-0.0009136	*	0	0.0021964
4	-0.0043033	*	-0.0028548	*	0	0.0021964
5	-0.0061007	*	-0.0040711	*	0	0.0021964
6	-0.002312	*	-0.0030146	*	0	0
7	-0.002534	*	-0.0002089	*	0	0.0021964
8	-0.001152	*	0.0014728	*	0	0.0021964
9	-0.0021736	*	-0.0015989	*	0	0
10	0.0002141	*	-0.0058575	*	-0.0060716	-0.0038752
	72479		5661			

Upper hits (Median)

Day	Limit	Significance	No limit	Significance
-1	0.0033223	*	0.0019057	*
0	0.1	*	0.09888	*
1	0.0026687	*	-0.021665	*
2	-0.009165	*	-0.0163934	*
3	0		0	
4	0		-0.0011669	*
5	-0.000886	*	-0.0025707	*
6	0		0	
7	0		0	
8	0		0	
9	0		0	
10	0		-0.0045249	*
	72479		5661	

Lower hits (Mean)

Day	Limit	Significance	No limit	Significance	Difference	D-in-D
-1	-0.0110371	*	0.0005062	*	0.0115433	0.0137397
0	-0.0990995	*	-0.0976849	*	0.0014146	0.003611
1	0.0013442	*	0.0002439	*	0	0
2	0.0038023	*	-0.0070414	*	-0.0108436	-0.0086472
3	0.0062938	*	-0.002144	*	-0.0084378	-0.0062414
4	-0.0013508	*	-0.001502	*	0	0
5	0.0008191	*	-0.0033082	*	0	0
6	0.0019355	*	-0.001432	*	0	0
7	0.0089473	*	-0.0009565	*	-0.0099038	-0.0077074
8	0.0000659	*	-0.0012451	*	0	0
9	0.0084611	*	0.0016341	*	-0.006827	-0.0046306
10	0.0044078	*	-0.00351	*	-0.0079178	-0.0057214
	53656		3043			

Lower hits (Median)

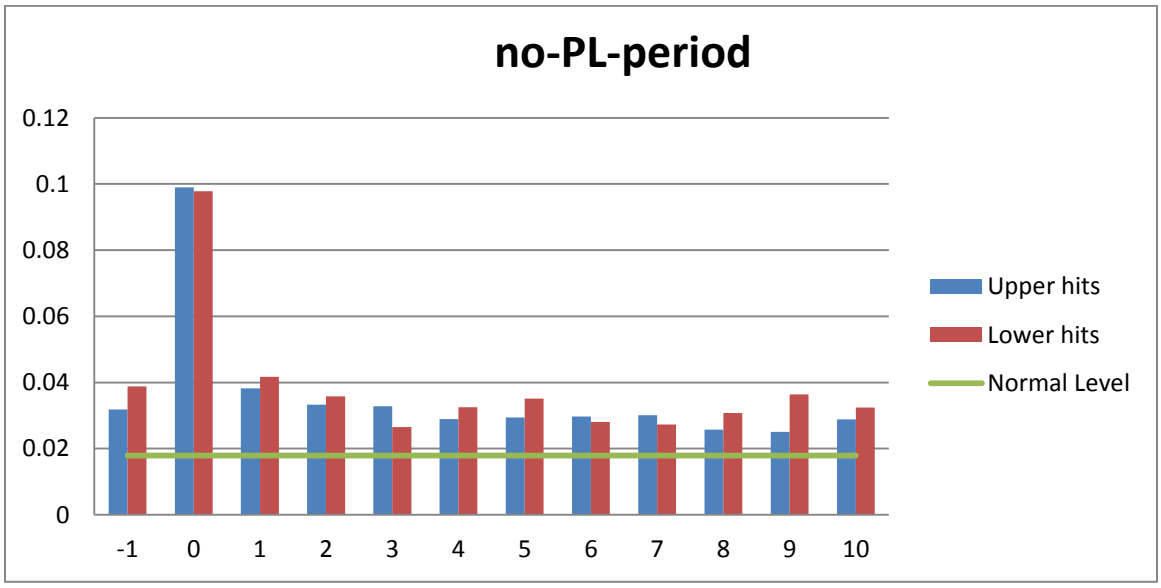
Day	Limit	Significance	No limit	Significance
-1	-0.0056856	*	-0.0003151	*
0	-0.0995316	*	-0.0977528	*
1	0.0014094	*	0.001321	*
2	0.000473	*	-0.0047626	*
3	0.0045455	*	-0.0013052	*
4	0		0	
5	0		-0.0027739	*
6	0		0	
7	0.004908	*	0	
8	0		0	
9	0.004415	*	0	
10	0		-0.0055292	*
	53656		3043	

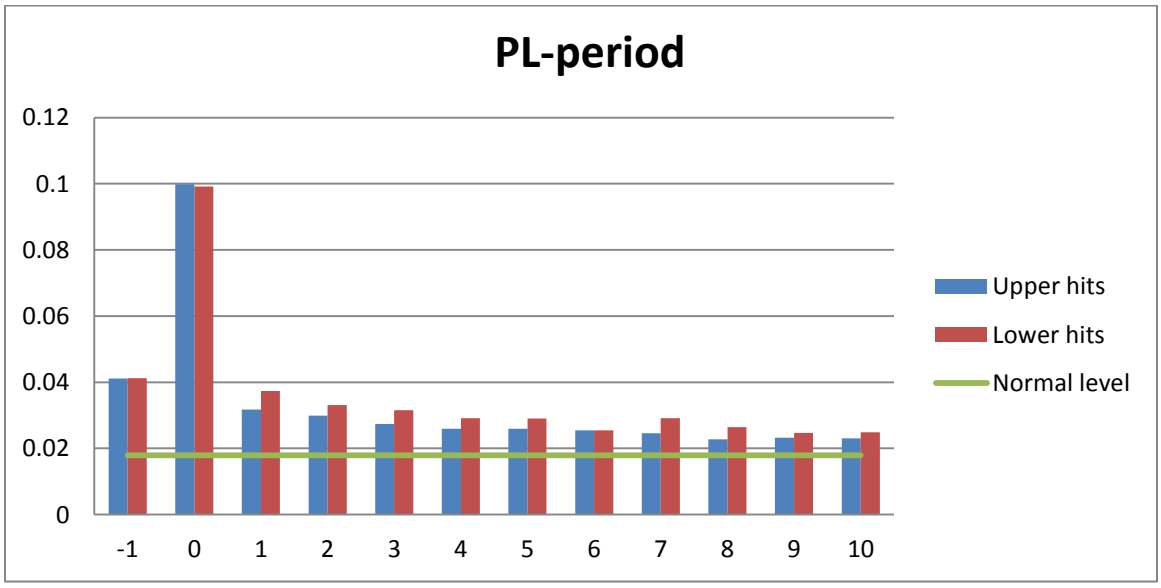
N. Sample Stocks

N.1 List of Sample Stocks

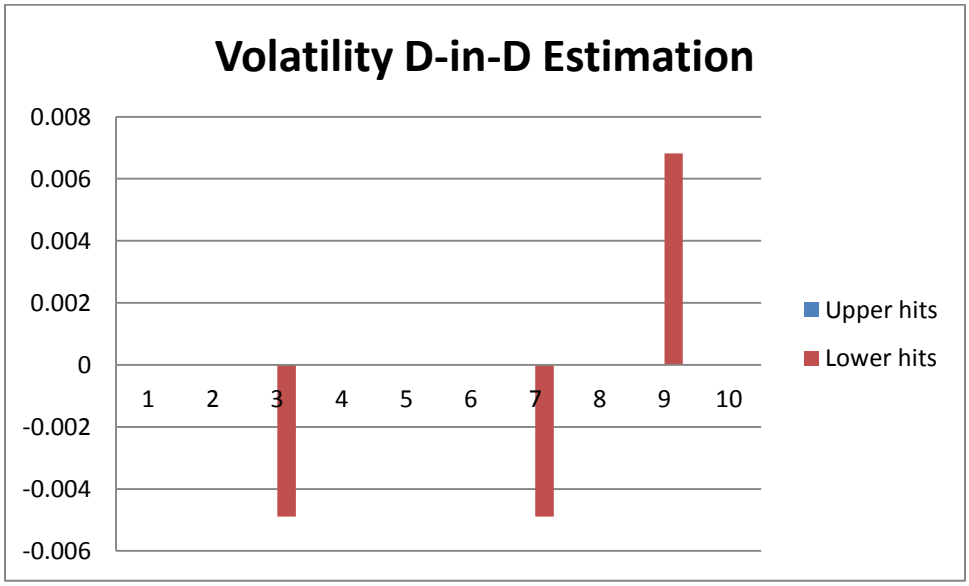
Stock Name
BAOLILAI INV.GUANGDON 'A'
CHINA TEX.MCH.'A'
CSG HOLDING 'A'
DAZHONG TRSP.(GROUP) 'A'
DONGGUAN FANGDA RENEW. RES.IND.'A'
FOUNDER TECH.GP. 'A'
KONKA GROUP 'A'
LAO FENG XIANG 'A'
SHAI.ACE 'A'
SHAI.BRDBD.TECH.'A'
SHAI.DINGLI TECH.DEV. (GROUP) 'A'
SHAI.FEILO 'A'
SHAI.FEILO ACOUSTICS 'A'
SHAI.INDL.PHARM.INV. 'A'
SHAI.WINGSUNG INV.MAN. 'A'
SHANGHAI ERFANGJI 'A'
SHANGHAI HUITONG EN.'A'
SHANGHAI SHENHUA HDG.'A'
SHENYANG JINBEI AUTV.'A'
SHENZHEN CAU TECH.'A'
SHENZHEN DEV.BANK 'A'
SHENZHEN ZERO-SEVEN 'A'
SHN.CHINA BICYCLE 'A'
SHN.GINTIAN INDS. 'A'
SHN.PETROCHEM.IND.GP.'A'
SHN.VCT.ONWARD TEXTILE INDUSTRIA 'A'
SHN.ZHONGHAO (GROUP) 'A'
SHN.ZHONGHENG HUAFA 'A'
SVA ELECTRON 'A'

N.2 Back to “Normal”

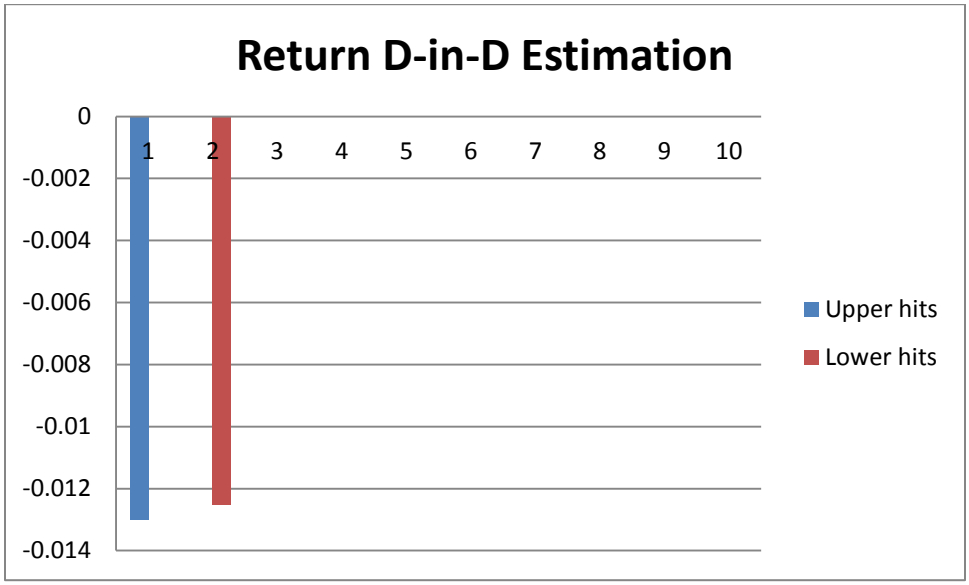




N.3 Volatility D-in-D Estimation



N.4 Return D-in-D Estimation



N.5 Volatility Results

Volatility							
Upper hits (Mean)					Upper hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0411316	0.0318411	-0.0092905	-0.014181	-1	0.0308771	0.025
0	0.0998063	0.0990032	-0.0008031	-0.0056936	0	0.1	0.0989673
1	0.0317492	0.0382689	0.0065197	0	1	0.026534	0.0350998
2	0.0299506	0.0332779	0	0	2	0.0231475	0.0280843
3	0.0273927	0.0328515	0.0054588	0	3	0.0214827	0.0304639
4	0.0259013	0.0288969	0	0	4	0.0204715	0.02337
5	0.0259837	0.0293938	0	0	5	0.0190397	0.0239984
6	0.0254792	0.0297048	0	0	6	0.0183731	0.0246896
7	0.0246061	0.0301225	0.0055163	0	7	0.0178856	0.0243575
8	0.0227595	0.0257331	0	0	8	0.0167951	0.0175888
9	0.0231956	0.0251167	0	0	9	0.016951	0.0200513
10	0.0230737	0.0288267	0.0057529	0	10	0.0173847	0.0237111
	11156	1659				11156	1659
Lower hits (Mean)					Lower hits (Median)		
Day	Limit	No limit	Difference	D-in-D	Day	Limit	No limit
-1	0.0412752	0.0387709	0	-0.0048905	-1	0.0343717	0.0352304
0	0.0991302	0.0977889	-0.0013413	-0.0062318	0	0.0996289	0.0978934
1	0.0373982	0.0417554	0	0	1	0.030585	0.0352285
2	0.033097	0.0357723	0	0	2	0.0277592	0.0325415
3	0.0315669	0.026573	0	-0.0048905	3	0.0261786	0.0223149
4	0.0291034	0.0325501	0	0	4	0.0230378	0.0264317
5	0.0290415	0.0351168	0	0	5	0.0207445	0.0254883
6	0.025417	0.0280542	0	0	6	0.0187699	0.0218541
7	0.0291808	0.0272925	0	-0.0048905	7	0.0227694	0.0222795
8	0.0264217	0.0307373	0	0	8	0.021533	0.022695
9	0.0246687	0.036375	0.0117063	0.0068158	9	0.018226	0.0320151
10	0.0249037	0.0324296	0.0075259	0	10	0.0177112	0.0252528
	5644	980				5644	980

Daily Returns

Upper hits (Mean)							Upper hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	0.0154829	*	0.0011693	*	-0.0143136	-0.011834	-1	0.0095603	*	0.0003537	*
0	0.0998063	*	0.0990032	*	-0.0008031	0.0016765	0	0.1	*	0.0989673	*
1	0.0039698	*	-0.0115291	*	-0.0154989	-0.0130193	1	0.003332	*	-0.0143557	*
2	-0.0065574	*	-0.0063833	*	0	0	2	-0.0003497	*	-0.0079228	*
3	-0.0044177	*	-0.0030442	*	0	0	3	0		-0.0000735	*
4	-0.0021049	*	-0.0017376	*	0	0	4	0		-0.0036043	*
5	-0.0050622	*	-0.0062146	*	0	0	5	-0.0020048	*	-0.0025542	*
6	-0.0015454	*	-0.0029243	*	0	0	6	0		-0.0074536	*
7	-0.0016553	*	-0.0028616	*	0	0	7	0		-0.0025024	*
8	-0.0020321	*	-0.0019041	*	0	0	8	0		0	
9	-0.0028446	*	-0.0005675	*	0	0	9	0		0.0014524	*
10	-0.0022513	*	-0.0028252	*	0	0	10	0		0	
	11156		1659					11156		1659	

Lower hits (Mean)							Lower hits (Median)				
Day	Limit	Significance	No limit	Significance	Difference	D-in-D	Day	Limit	Significance	No limit	Significance
-1	-0.0151074	*	-0.0038125	*	0	0.0024796	-1	-0.0078817	*	-0.0138146	*
0	-0.0991302	*	-0.0977889	*	0.0013413	0.0038209	0	-0.0996289	*	-0.0978934	*
1	0.0048989	*	0.0010198	*	0	0	1	0.0075106	*	0.001671	*
2	0.007253	*	-0.0077699	*	-0.0150229	-0.0125433	2	0.0030025	*	-0.0018903	*
3	0.0071891	*	0.0010664	*	0	0	3	0.0062784	*	0.0039026	*
4	0.0011071	*	0.0012123	*	0	0	4	0		0.0036588	*
5	0.0063002	*	-0.0004785	*	0	0	5	0.0023049	*	0.0034562	*
6	0.0037244	*	-0.0059545	*	-0.0096789	0	6	0.0011703	*	-0.0016239	*
7	0.0094159	*	0.003552	*	0	0	7	0.0036056	*	-0.0023388	*
8	-0.0002405	*	0.0055456	*	0	0	8	0		-0.0018692	*
9	0.0062972	*	-0.0006998	*	0	0	9	0.0026596	*	-0.0045994	*
10	0.0041105	*	0.0033456	*	0	0	10	0		0.0032845	*
	5644		980					5644		980	